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THE *Refrigeration* **Industry**

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SEPTEMBER, 1945

AIR CONDITIONING
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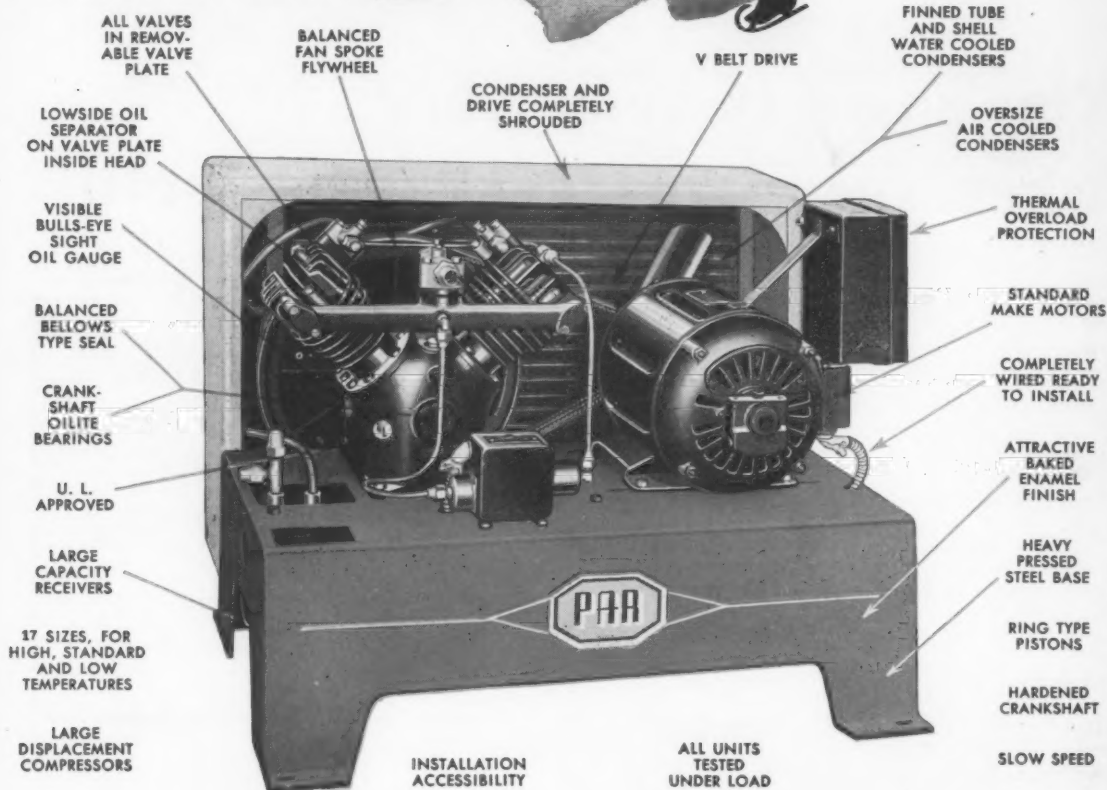
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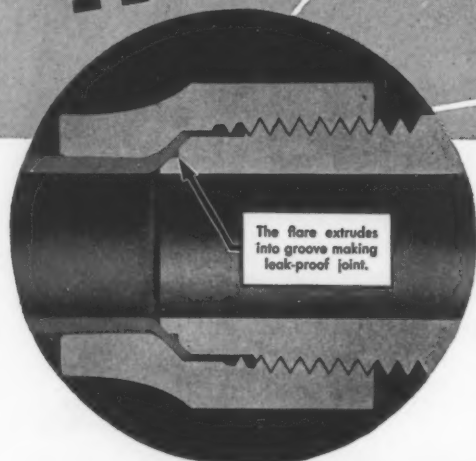
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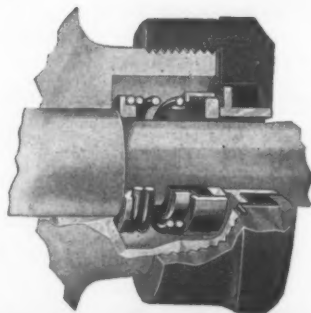
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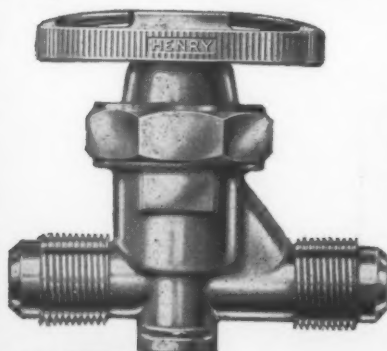
tive performance under all conditions of service because it is truly non-directional.

You will also like the Henry feature of having inlet and outlet ports in line on two way and three way valves. This eliminates tube bending and results in neater lines and lower installation costs.

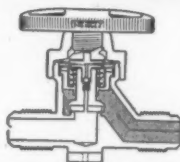
During the war Henry Diaphragm Packless Valves have been widely favored by all branches of the armed services. It is only natural that, as our country gradually turns to the problems of Peace, this Henry Product again will be the logical choice of manufacturers, jobbers, contractors and service organizations everywhere.

The Difference Between a Henry Non-Directional Balanced-Action Diaphragm Packless Valve and a Conventional Packless Valve

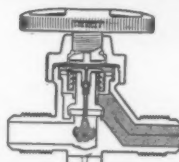
Available in a complete range of sizes with flare or solder connections.



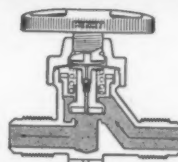
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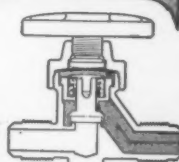
BALANCED-ACTION VALVE IN CLOSED POSITION—High pressure above the seat, low pressure below the seat. High pressure regions are shown in color. Pressure in spring cage below diaphragms is the same as that in main passage of valve body above the seat. This is due to seepage between the lower stem and the guide. Downward pressure of the bearing plate on the diaphragms seals the upper port of the balancing channel.



OPENING THE BALANCED-ACTION VALVE—As hand wheel is turned to open valve the diaphragms, because of pressure beneath them and their own snap action, rise and expose the upper port of the balancing channel. The high pressure, shown in color, unseats ball check and is instantly released through the open channel to the low pressure region below the valve seat, thus achieving "balanced-action" by equalizing pressures.



BALANCED-ACTION VALVE IN FULL OPEN POSITION—Equalization or balancing of pressures above and below the seat, as shown in color, guarantees that this valve can never "stick shut" but will always open positively, regardless of original differential in pressures. When there is high pressure below the seat and low pressure above, the balanced valve opens easier than other types because of the light weight spring.



CONVENTIONAL TYPE WITHOUT BALANCED-ACTION—As hand wheel is turned to open valve the diaphragms rise. When the differential between high pressure, shown in color, above seat and low pressure below seat is greater than force exerted by heavy spring, stem "sticks shut"—valve remaining closed. The heavy spring required in this type of valve greatly increases diaphragm wear and strain and causes stiff closing.

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THE *Refrigeration* INDUSTRY

VOLUME 2, No. 9

SEPTEMBER, 1945

*The
Refrigeration
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OFFICES—

812 Huron Road,
Cleveland 15, Ohio

NEW YORK OFFICE—

CHESTER RICE
60 E. 42nd Street,
Room 950
New York 17, New York
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EDITOR: T. T. QUINN;
Editorial Advisors: H. S.
McCLOUD, WARREN W.
FARR; Art Director: JAMES
B. HENDERSON, ARTHUR
R. BOUHALL; The Staff—
WM. V. LINAS, R. EVERETT,
Production Department; M.
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THE COVER . . . Trays of frozen penicillin are loaded into high vacuum chambers for dehydration at the Brooklyn, N. Y. plant of Charles Pfizer & Co. To maintain purity of product, attendants are masked, and double rows of Sterilamps wage war against invisible air-borne bacteria. (Westinghouse photo).

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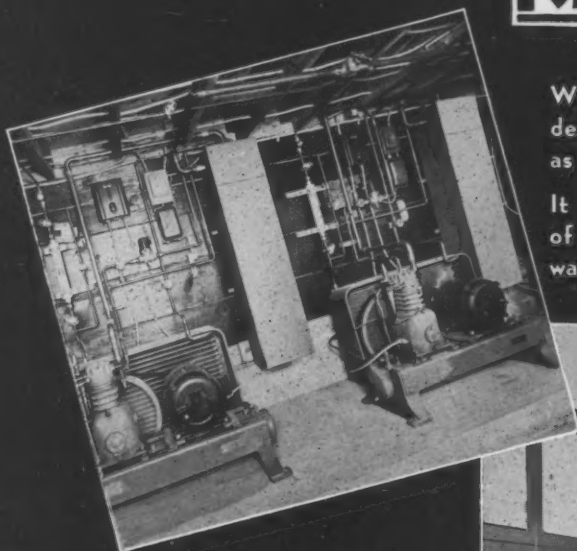
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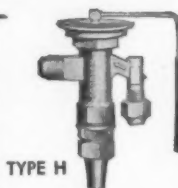
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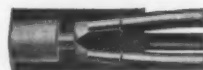
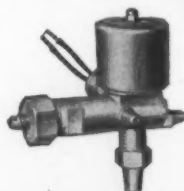


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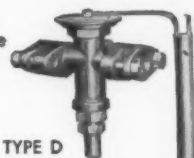


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**QUIET
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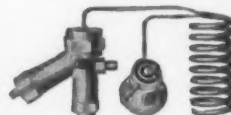
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Up to 100 tons Methyl Chloride
Up to 10 tons Sulfur Dioxide
Up to 100 tons Ammonia
Up to 20 tons Freon 22



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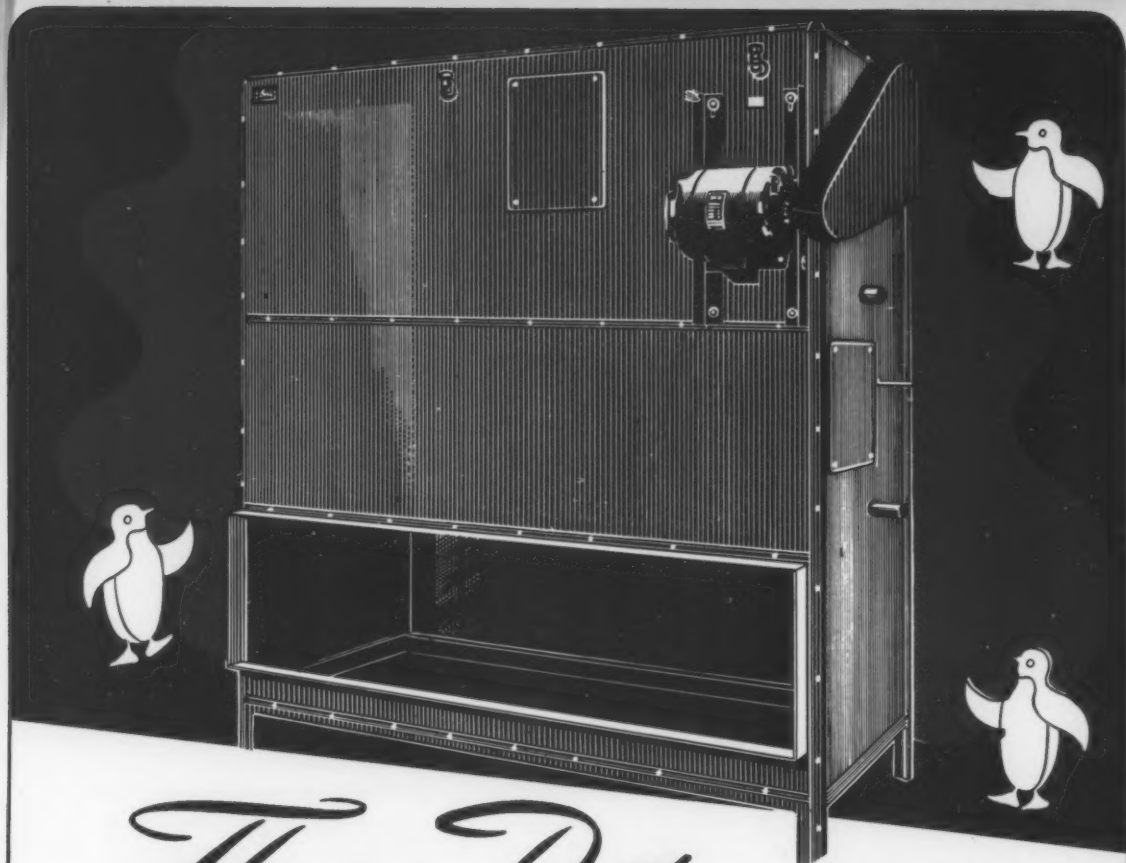


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When a refrigeration system is too big to dry by placing in an oven—when circumstances do not permit heating it by means of radiant lamps for the heat and vacuum drying process, and when there is more moisture than can be taken out by a cartridge dryer, it may be dried effectively by use of heated dry air.

Hot air, or any other inert gas, such as nitrogen or carbon dioxide has the capacity to hold water as a vapor, and this capacity increases with temperature increase. Air is said to be saturated when it cannot evaporate any more water. For example air at -25° F. and at atmospheric pressure is saturated when it contains .0001968 pounds of water per pound of dry air. At 200° F. this pound of dry air will hold 2.261 pounds of water as vapor.

The coil and tubing may be dried by putting enough hot dry air through them. There are two ways—by the "pull through" and by the "pressure" methods.

The pull through method is a variation of the vacuum drying method, except that the heat comes from the air, instead of from heat lamps, or an oven. It has the advantage of making the heat available to all parts.

A diagram of a typical pull through setup is shown in Fig. 1. A vacuum pump is connected to one end and an

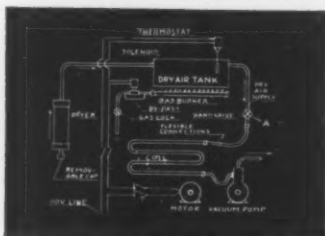


Fig. 1—Drying system using vacuum method

air tank to the other end of the coil to be dried. A gas burner is used to heat the air tank. This setup shows a thermostatic control for the gas burner.

The intake of the dry air tank is through a cartridge dryer. Anhydrous calcium chloride is a good drying material to use. It is recommended that the cartridge be mounted so the incoming air travels upward. This prevents carrying calcium chloride or water into the parts. A vacuum can be drawn by closing valve A. In the process of drying, heated air from the dry air tank is drawn through the system until the system is warm throughout. Then the valve is closed, and a vacuum is drawn with the vacuum pump. From time to time additional hot dry air is drawn into the

system, and the process is continued until drying is complete. Obtain safe maximum temperature from coil manufacture; otherwise do not exceed 175° F.

A diagram of a typical "pressure" setup is shown in Fig. 2. The tank here must be air tight, and tested to twice the pressure it is desired to use for drying. It should be equipped with a relief or safety valve set to pop at about 10% above the working pressure. A drain should be placed on the bottom of the pressure tank for removal of any water or oil which may be carried over from the compressor. Obtain safe working pressure from coil manufacture; otherwise, do not exceed 50 p.s.i. In this setup,

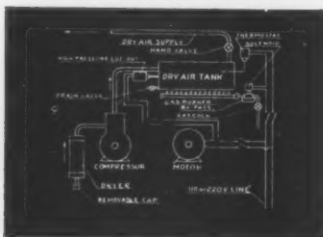


Fig. 2—Pressure type dehydrating equipment

the motor drives a compressor which pumps dry air into the tank where it is heated by a thermostatically controlled gas burner. Obtain safe maximum temperature from coil manufacture; otherwise, do not exceed 175° F.

The compressor draws air through a calcium chloride cartridge so that it is as dry as possible when introduced into the tank. The pump should be controlled by a pressure switch actuated by tank pressure and adjusted to hold the pressure within proper limits.

In this system of drying, hot dry air is blown through the coil and tubing until the desired result is obtained. Much of the moisture in a system is likely to be trapped under an oil film. In both of these drying methods the heat, lowering the viscosity of the oil film, permits the trapped moisture to escape.

Either of these drying devices may be assembled on the U.L. or may be arranged as a permanent drying rig on a suitable mounting, so it may be easily moved to the job, and put to work as soon as the necessary connections are made.

Once the system is thoroughly dry, it must be sealed immediately so that moisture cannot find entry again.

NOTE: When using either of the above methods of drying, the expansion valve should be removed from the line.

DETROIT LUBRICATOR COMPANY Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

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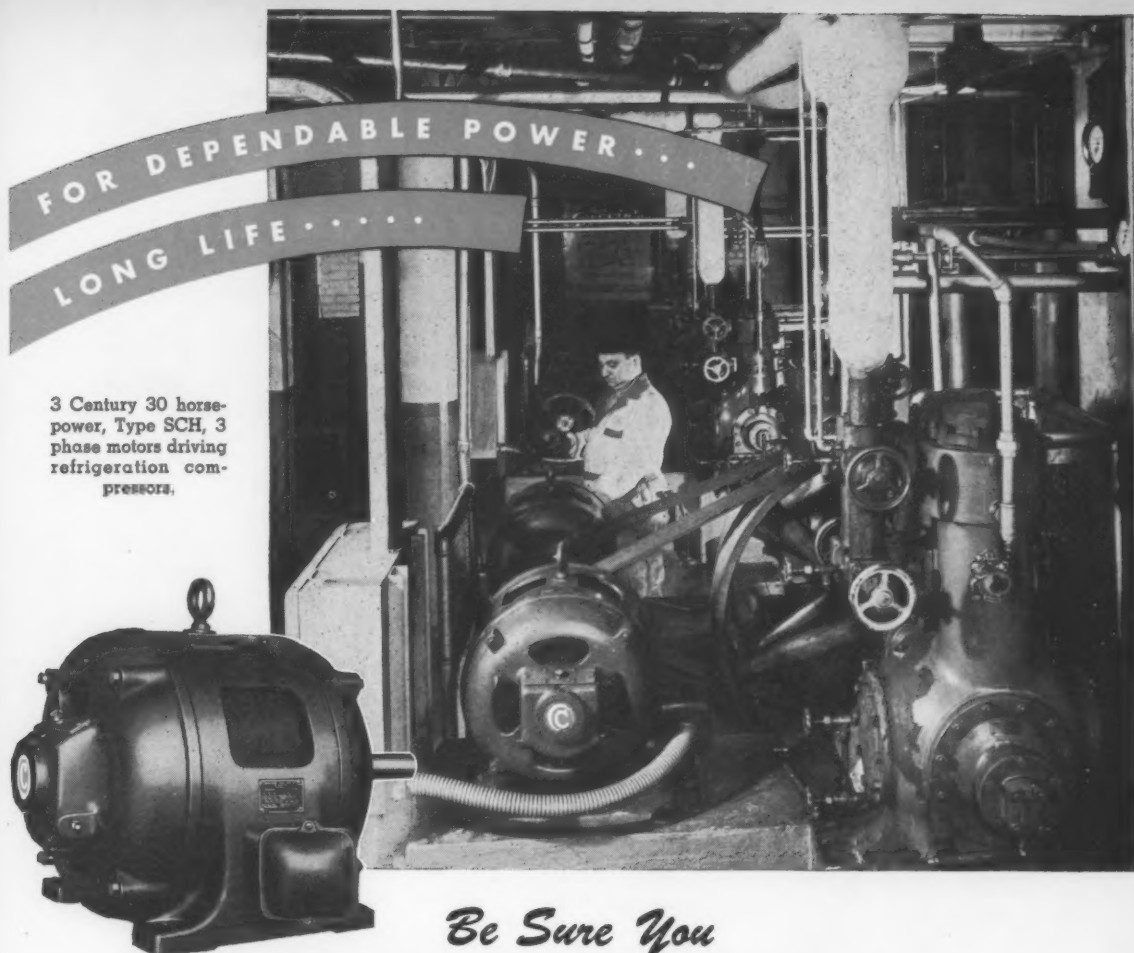
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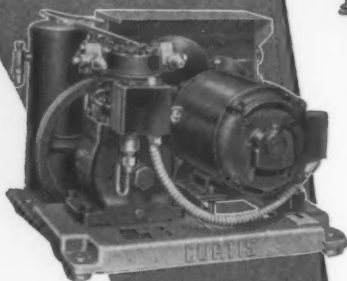
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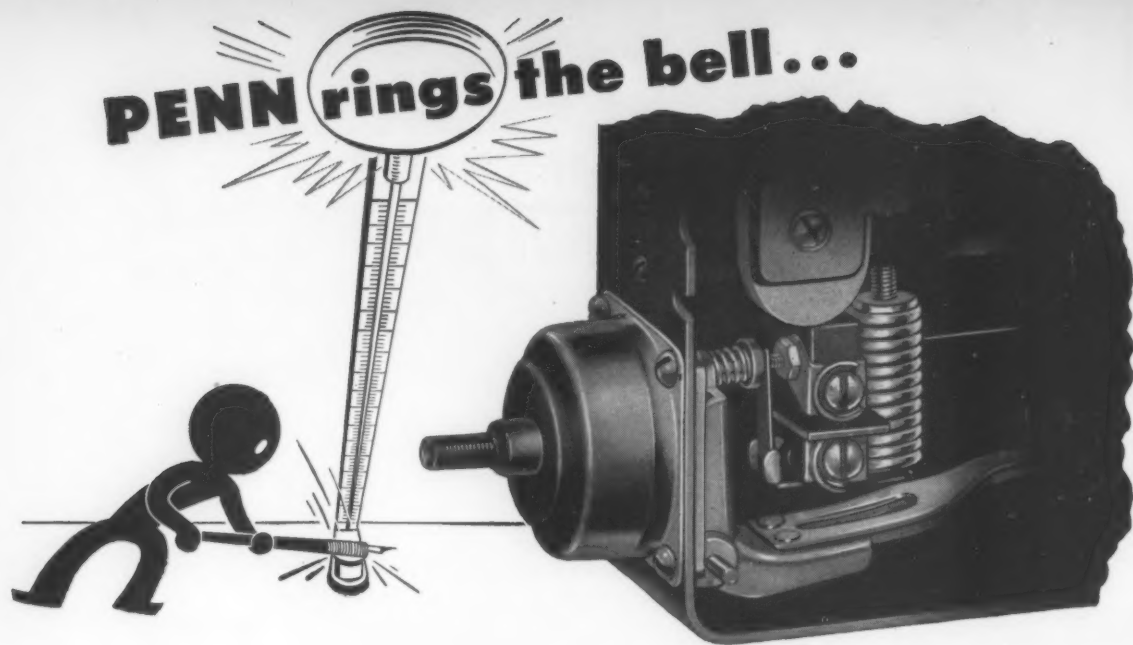
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SUN INDUSTRIAL PRODUCTS

OILS FOR AMERICAN INDUSTRY

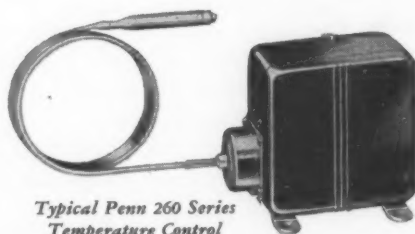


In protecting food supplies!

● Critical food supplies are subject to spoilage and waste . . . whenever there is any interruption in required cooling. Yet little troubles can crop out in even the best commercial refrigeration systems. These troubles may be unimportant in themselves but they can cause abnormal "warm-up." To warn against any excessive temperature rise, PENN has developed its Auxiliary Alarm Contact Structure.

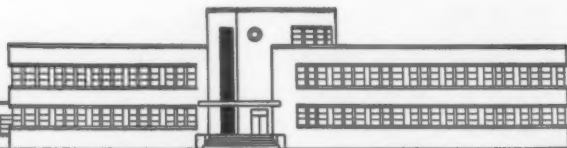
This temperature detective *rings a bell, flashes a light* or brings some other warning device into operation . . . when the temperature rises above the predetermined safe maximum. Providing added protection for deep freezers and commercial low temperature boxes . . . this device is available in all standard temperature and pressure controls.

Send for full details on the PENN Auxiliary Alarm Contact in Bulletin R-260-D. You'll find other vital data on PENN Refrigeration Controls, too. Write *Penn Electric Switch Co., Goshen, Ind.* Export Division: 13 E. 40th Street, New York 16, U.S.A. In Canada: Powerlite Devices, Ltd., Toronto, Ont.



Typical Penn 260 Series
Temperature Control

PENN



AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

THE REFRIGERATION INDUSTRY

RTU

News • Laws • Trends

● AS THIS IS WRITTEN, the mightiest war in history is ended. Switching over from war-time to peace-time production won't be fully accomplished for several months, especially in the household refrigerator field. Commercial equipment makers should switch over faster, since to a large degree their war production has been more akin to that of peace-time. Production "ceilings" will be lifted, but distribution will be continued over scarce raw materials. Small manufacturers will continue to be helped in their supply bottleneck problems. Rationing may end, but price control will continue. All in all, civilian production will be returned to normal as quickly as possible, but this may not be accomplished with the same miraculous speed with which the nation swung into all-out war production. Possibly 1,300,000 household units will be made by year's end, but the matter of who gets them may pose a knotty problem. But it won't be long now . . .

● THE INDUSTRY'S 1944 SHIPMENTS of commercial and air conditioning equipment totaled 153,026 units valued at \$52,594,000, according to Bureau of the Census statistics. This was 31% under 1940 and covers only standard unitary equipment; figures on specially-built military equipment, if classifiable, might put last year's totals over 1940. Totals included 55,895 water coolers, 28,552 milk coolers, 23,400 reach-ins, 7,600 display cases, 16,742 enclosures, and 25,091 cold storage doors. Condensing unit makers shipped 189,578 units valued at \$21,872,000; nearly one-half of these were incorporated into equipment built by unitary equipment makers. Complete figures on 1944 (Facts for Industry Series M52A-04) may be had from the Census Bureau.

● REMA'S TENTH ANNIVERSARY meeting pledged full support of any government-industry-labor program which will help all three solve their postwar problems and maintain employment. Export problems alone, Rema directors felt, would warrant such a plan, since Great Britain and other European countries already are promising delivery of civilian items to South America which U. S. industries cannot now ship without a government license.

THE ALL-INDUSTRY SHOW, when resumed, may be held in Cleveland's civic auditorium, where about 250,000 sq. ft. of floor space is available. Rema intends to invite all industry associations to join in the next Show. Dates most favored were March or October, 1946.

● THE NATION'S BANKS reportedly are now taking strong steps to move into postwar refrigerator and appliance financing, long considered the domain of finance companies like Commercial Credit and C. I. T. Recently 32 Philadelphia banks sponsored a cooperative advertising campaign urging their customers to modernize wiring and obtain, when available, a long list of labor-saving appliances. The National Sales Finance Plan, announced recently, has two national banking groups financing instalment buying of household appliances through manufacturers, distributors and dealers. At least one bank in each region will be organized to assist smaller banks in buying instalment paper; and distributor-to-dealer sales also will be handled.

● GENERAL ELECTRIC, FRIGIDAIRE AND SEEGER-SUNBEAM have announced they have started their household refrigerator production lines up again. In the case of the first two companies, it was the first production of this equipment since April 30, 1942; Seeger's last cabinet rolled off the lines on March 9 of that year. At G-E's Erie, Pa. plant, the last machine made before production ceased in 1942 was removed from its crepe-covered "coffin" and trundled over to meet its newest companion. Incidentally, the first new G-E unit carried serial number 4,523,666.

● HOUSEHOLD AND COMMERCIAL refrigeration manufacturers are among the industries making outstanding strides toward reconversion, WPB reports. Present production of household concerns, figures show, totals \$141,225,000 per quarter, of which \$126,859,000 is strictly military equipment; commercial refrigeration firms are producing at the rate of \$58,696,000 per quarter, \$40,827,000 of which is military equipment. For household firms, "break-even" production is figured at \$30,589,000 per quarter, capacity production at \$93,251,000. For commercial companies, the break-even figure is \$37,000,000; all-out production, \$65,000,000 per quarter. Carbon steel requirements for minimum production are: household 43,860 tons, commercial 31,000 tons, per quarter.

● APPROVAL OF A MERGER of Utah Radio Products Co. and Universal Cooler Corp. into International Detrola Corp. has been voiced by the directors of all three companies. Meetings of stockholders to vote on the proposal will be held shortly. Detrola previously had acquired controlling ownership of Rohr Aircraft Corp., Chula Vista, Calif., which WPB has authorized to produce 1,014 household refrigerators this year. Availability of substantial additional working capital as a unit of a much larger enterprise is one of the chief advantages foreseen by Universal Cooler directors, according to president F. S. McNeal. Universal Cooler, he added, will gain added plant capacity anticipated for postwar production needs.

● CURTIS MFG. CO. WAS publicly commended by WPB's chief of staff, J. D. Small, for its voluntary adoption of a purchasing policy designed to prevent indiscriminate duplication of unrated purchase orders. In a letter to all its sources of supply, Curtis has assured them that any commitments it may make are bona fide and not

Continued on page 61

Classification and Operation of

What job is a water-cooled condenser supposed to accomplish? How does it do it? What type works best in a given job? This will tell you

By George H. Clark

WATER-cooled condensers may be classified into three general types as follows:

1. Shell and water tube.
2. Shell and refrigerant tube.
3. Double tube or counterflow.

The *shell and water tube* type of condenser has been extensively used for commercial refrigerating machines. The shell is made up of either a horizontal or vertical cylindrical vessel, and the water tube is usually formed into a coil or coils on the inside of the vessel, with the water inlet and outlet connections brazed into one head of the vessel. In a condenser of this type, the outer surface of the water tube is the condensing surface.

Heat transfer in a condenser of this type is good, because the tube surface is wet with condensing refrigerant. Since the tube diameter is usually quite small ($\frac{3}{8}$ to $\frac{1}{2}$ O. D.) the water is confined quite closely to the inner walls of the tube, and the heat transfer from the tube to the water is excellent. However, the refrigerant is not confined very closely to the outer tube wall, and as a result the heat transfer to the outer tube

wall is not as rapid as it might be. There is a decided flow of refrigerant vapor to the tube, however, as the volume of the refrigerant decreases rapidly as it condenses, which, as far as refrigerant flow is concerned, has the same effect as moving refrigerant vapor by means of a suction fan.

In general, the water tube of the shell and tube type condenser is nothing more than a bare tube coil. It would appear, however, that a lower cost and more efficient type of shell and tube condenser would result from the use of finned tubes.

In the *horizontal type* of shell and tube condenser, the tubing may be wrapped into a coil which fits fairly closely into the shell. In this case, the water tube spirals from one end of the shell to the other, and each spiral goes from bottom to top of the shell. The water passing through the coil enters at its lowest temperature, and as it passes through the lower (or submerged) part of the coil it tends to reduce the temperature of the condensed liquid down to inlet water

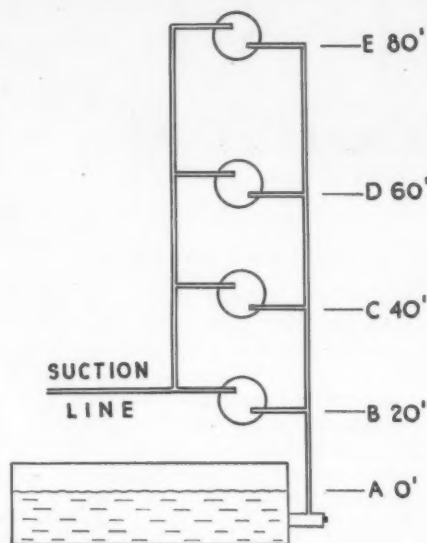


FIGURE 1



Our ambitious acquaintance, Little Elmer, keeps digging into the darndest things! This month he's stuffing himself on the subject of water-cooled condensers. Why not educate yourself with Elmer? You'll be hearing from him again in future issues.

☆ ☆ ☆

TABLE I.

Case No.	TEMPERATURES					BTU/rmvd hr	Lbs. water/hr used
	Inlet Ref.	Cond.	Liquid Lv.	Water In	Water Out		
1.	120	80	75	60	73	21,200	1630 $\frac{1}{2}$ /hr
2.	120	80	65	60	77	21,600	1270 $\frac{1}{2}$ /hr
3.	120	80	62	60	82	21,720	942 $\frac{1}{2}$ /hr
4.	120	80	78	60	76	21,080	1318 $\frac{1}{2}$ /hr

WATER-COOLED CONDENSERS

temperature. But as it passes through the upper part of the coil, it removes latent heat and some superheat from the refrigerant at a temperature considerably higher than that of the coldest liquid.

As the water passes through the coil it gradually warms up, and then as it passes through a submerged part of the coil it tends to add heat to the liquid refrigerant, rather than remove heat from it. If the water could be heated in an upper part of the coil by superheated gas to a temperature above condensing temperature, it would be cooled down again in the lower part of the coil by re-evaporating the condensed liquid. Consequently, in a condenser of this type we can be reasonably sure that the water will not leave the condenser at a temperature greater than the condensing temperature, and that the liquid refrigerant will not leave the condenser at a temperature lower than the outgoing water.

Some horizontal shell and tube type condensers may have a removable head on which the water coil is mounted. This allows the tube to be paralleled for lower resistance to water flow, and also may make a water tube arrangement practical which calls for horizontal passes of tubing. In this case, the water may enter the condenser tube below the liquid level in the condenser, in which case it tends to cool the condensed liquid to incoming water temperature. Then, as the water enters the coil above the condensed liquid, it removes latent heat from the condensing refrigerant.

Of course, the water can only remove latent heat as long as it is at a temperature below condensing temperature. Therefore, we can assume that the water will leave the condenser at a temperature lower than condensing temperature, but that the condensed refrigerant may leave the condenser at a temperature lower than that at which the water leaves. This type of condenser thus makes better use of the water than the spirally coiled horizontal shell type, provided,

of course, that the water enters the lower part of the coil first and progresses upward to the outlet.

The vertical shell and tube condenser acts much the same as the horizontal type with the horizontal coil passes. In the vertical type the water should enter the lower part of the spiral coil, where it sub-cools the condensed liquid to a temperature approaching the inlet water temperature. The water then passes into the

tube at its lowest temperature and removes heat from the condensed refrigerant liquid cooling it to almost the same as the incoming water temperature. Then, as the water passes upward through the water coil, it removes heat from the condensing refrigerant, and before it leaves at the top of the coil it removes heat from the superheated refrigerant, and thereby may be heated to a temperature above the condensing tem-

Table II

Point	Elevation	Methyl Chloride		Freon-12		Sulphur Dioxide	
		Press. PSIA	Temp. °F	Press. PSIA	Temp. °F	Press. PSIA	Temp. °F
A	0	119	100°	117	100°	85	100°
B	20'	111	96°	106	94°	74	92°
C	40'	103	91°	95	87°	62	82°
D	60'	95	86°	84	80°	51	71°
E	80'	87	81°	73	72°	39	58°

portion of the water coil which removes the latent heat and superheat from the condensing refrigerant. In order to be able to remove latent heat, the water must be at a temperature lower than condensing temperature, so that in the vertical shell and tube condenser the water will leave at a temperature below condensing temperature, and the refrigerant liquid will leave at a temperature only slightly above incoming water temperature.

The counterflow type is inherently the most efficient type of water-cooled condenser, and unless it is under-size, or the tubes are poorly proportioned for the job, it will give good performance.

In the double-tube counterflow condenser, the water enters the inside

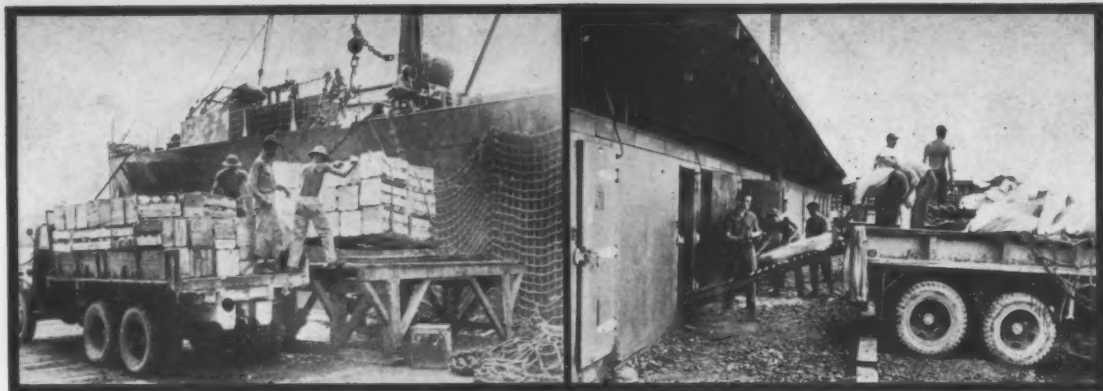
perature. The maximum result is accomplished when the leaving water temperature is higher than condensing temperature and the liquid refrigerant leaves at a temperature very slightly above incoming water temperature.

In the vertical shell and tube condenser, as well as the double-tube type, it is important to have the water enter the bottom of the water coil and the refrigerant enter at the top; or, the flow of water should be counter to the flow of refrigerant. If both water and refrigerant entered a double-tube condenser at the top, the heat transfer would be very great for the first part of the tube, as the temperature difference between the incoming cold

Continued on page 37

Table III

Point	Elevation	Methyl Chloride		Freon-12		Sulphur Dioxide	
		Press. PSIA	Temp. °F	Press. PSIA	Temp. °F	Press. PSIA	Temp. °F
A	0	85	80°	84	80°	60	80°
B	20'	77	73°	73	72°	48	69°
C	40'	69	66°	61	63°	36	54°
D	60'	61	59°	50	53°	24	35°
E	80'	52	51°	38	41°	11	3°



From ship (left) to storage refrigerator (right) in doublequick time goes the armed service's food supply.

Overseas

Overseeing

The experiences of one refrigeration engineer in his installation and re-building work for the armed services in two of our major invasion areas

By Frank J. Forenza



Frank Forenza, now back at Dole Refrigerating Co. after his overseas work, has been in the company's experimental laboratory, and later was a sales engineer in the Cleveland-Pittsburgh territory and in Dole's New York branch.

IN 1942, I left the country as a civilian to do refrigeration work on American bases overseas for our government. In our group were tradesmen from every profession. Our work took us through the countries of the Middle East.

It took us more than two months to arrive at our destination. We arrived in Africa and were farmed out to the various bases to join the fellows who were already working on these projects. I was sent to a base in Eritrea.

My first assignment was the installation of air conditioning equipment in the barracks at this base. We installed ten-ton semi-hermetically sealed units with evaporative condensers in each barrack. These barracks were two stories high and would accommodate approximately 65 men. We also installed several three-quarter horsepower room cooler units for the various offices and hospital rooms. At this base we used Italians and Eritrean blacks for laborers. Close by were two concentration camps where the troublesome ones found companionship. Here and in other bases in Eritrea were portable walk-in-coolers, some using blower coils and

Continued on page 42

Reloading food into trucks for advance outposts' use.



FROM THE JOBBER'S EXPERIENCE



Mr. J. M. OBERC, of J. M. Oberc, Inc., Detroit, says—

“OUR CUSTOMERS SAY DAVISON'S SILICA GEL PROVIDES A 'ZONE OF PROTECTION'”

“I've asked our customers what they mean by the phrase 'Zone of Protection'. They reply that when they use Davison's Silica Gel, they know they have remedied the trouble and have prevented future trouble. For when they use Davison's Silica Gel, moisture troubles are over AND many other troubles that are often found in 'tricky' jobs. Of course they have tried other drying agents. But that 'Zone of Protection' angle causes them to stick to the many additional advantages offered by Davison's Silica Gel.”

GIVES YOU—1. Maximum capacity that is not affected by oil; 2. Instant action; 3. Removal of Acids, Corrosive compounds and other impurities; 4. Freedom from Channelling of Refrigerant; 5. Safety—will not attack metals or alloys. Stock and recommend Davison's Silica Gel—in factory-charged dehydrators and for refilling.



Processed especially for the dehydration of refrigerants.



CURTIS RAY WORKS

THE DAVISON CHEMICAL CORPORATION
Progress through Chemistry **D** BALTIMORE-3, MD.

Canadian exclusive sales agents for DAVISON'S SILICA GEL: CANADIAN INDUSTRIES LIMITED, General Chemicals Division

SEPTEMBER, 1945



MEET McCOMBS

Remodeled and enlarged Denver headquarters store and Pueblo branch of McCombs Refrigeration Supply Co. are shown in the photos on this page. Denver personnel (above left) are: Lee Martin, W. M. Bowman, Frank Walters, Harold McCombs (president), R. C. Kimmel, LeRoy McCutchan, J. A. Marshall and Helen Gieseler. At right above, Don Wallace, Pueblo manager, writes up an order for Russell Gritton. In the middle photo at left is the display floor, where small accessory items will be placed on tables for inspection by customers of the headquarters store.



Above is the new McCombs Supply office; at right, an exterior view of the Denver headquarters building. Enlarged space now gives the company two floors, 50x100 feet, with full basement.



THEY'VE COME A LONG WAY TOGETHER

... REMA and Refrigeration. As it observes its tenth anniversary, the organization can look back on an unbroken record of contributions to the industry's progress through cooperation. Organized by less than a dozen companies in 1935, it now includes 80 firms.

ORGANIZED by less than a dozen companies in 1935 and growing steadily to where it now includes 80 manufacturers of all types of mechanical refrigeration and air conditioning parts, complete units and complete systems, the Refrigeration Equipment Manufacturers Association observed its 10th anniversary August 15 with a summer meeting of the board of directors in Marinette, Wis.

The directors were guests of F. J. Hood, newly elected Rema president, whose company is situated in the northern Wisconsin city.

The ten years which have elapsed since Rema was organized have marked some of the most important developments in the history of mechanical refrigeration and air conditioning. The next decade, in the opinion of association officials, will see even more far-reaching progress in both fields. It is on this premise that the association is basing its program for the future.

"One of the primary objectives of our association at the time it was begun in 1935 was to promote a closer and better defined relationship between manufacturers and parts and supply jobbers," Mr. Hood recalled. "A review of the last ten years of progress of the industry shows that this has been accomplished to an unusual degree, and work in this field is being continued on an undiminished scale.

"At the same time, we feel that Rema's position in the industry calls for a program designed to make the

public more and more conscious of the advantages of all types of mechanical refrigeration and air conditioning. Such a program has been undertaken and is well under way."

It is only necessary to compare the status of the industry in 1935 with its progress during the war to realize fully how far the industry has gone forward since Rema was organized.

In 1935, a good many milestones in refrigeration and air conditioning were reached and passed, and most of them now are considered commonplace. For example, the first legitimate theater was air cooled in that year. So were the big St. Louis auditorium, the Hayden Planetarium in New York, two gold mines in South

Africa, and twelve large government buildings in Washington. So were trucks, ships, railroad cars and buses. So was the Normandie.

The entire industry has gone on a volume production basis in the last decade, spurred as much as anything else by household refrigerators selling at \$100 or less instead of several hundred, and by such developments as the change from remote to self-contained household units which, in effect, brought mechanical refrigeration "up out of the basement" of the home.

The Refrigeration Equipment Manufacturers Association was formed at a meeting in Detroit, held concurrently with the second annual meeting of the Refrigeration Service Engineers Society. Rema's first name was the Refrigeration and Parts Manufacturers Association, and its first president was J. D. Colyer, who remained in office for three years. He was followed by J. S. Forbes, who was president for two years, during which the name was changed to its present form, and the first Rema all-industry show was held in Chicago. Mr. Forbes, who continues to take active part in Rema activities, also was the first vice-president. Other "first" officers were H. V. Higley, treasurer, and Earl A. Vallee, secretary.

On the same days Rema was being organized in 1935, the association now known as the National Refrigeration Supply Jobbers Association was in the process of formation at a separate meeting in Detroit. This organization, too, has made rapid progress, and today stands as the leader in its field.



These men, as officers and directors of Rema, are shaping the association's course for 1945. Front row (left to right): F. J. Hood (Ansul) president; H. F. Spoehrer (Sporlan) vice-president; E. M. Flannery (Bush) secretary; J. A. Strachan (Weatherhead) treasurer. Standing (left to right): A. B. Schellenberg, retiring president; C. H. Benson (Imperial); B. J. Scholl (Brunner); Guy J. Henry (Henry Valve); R. H. Luscombe (Penn Switch). Not shown are three new directors: W. H. Marshall (Wolverine), P. T. Miner (Tyler Fixture) and R. O. White (Day and Night).



SIGNPOST TO TOMORROW

Eliminating the fantasies and accentuating the facts, what can you really expect in the post-war tomorrow?

The new Mills $\frac{1}{2}$ H.P. Direct Drive Compressor is one After-V-E-Day development we can describe with certainty. It is almost 50% lighter than present belted units, more than 50% smaller. It operates at 1750 revolutions per minute. It delivers hermetic-type performance, but is repairable in the field. It has 14 superiorities to make it 14 ways better than conventional open-design compressors.

These are facts whose advantages you will appreciate when you can install Mills Direct Drive Compressors in your cabinets. We wish more of you could enjoy them at once. Unfortunately, it will be several months before the first units come off our production lines, and then quantities will necessarily be limited. Only a very few manufacturers can be accommodated in the first year of fabrication.

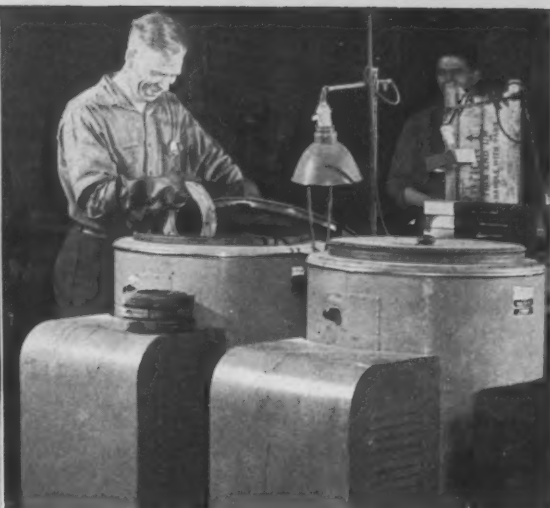
However, this engineering achievement is a signpost to Mills developments for tomorrow. It points towards things to come. Your own plans for the future wisely can be integrated with this and other accomplishments of Mills Engineering.

MILLS

4100 FULLERTON AVENUE, CHICAGO 39, ILLINOIS

INDUSTRIES, INCORPORATED

THE REFRIGERATION INDUSTRY



(Left) Testing rubber for resiliency; (right) gauge blocks being inserted into a sub-zero unit for stabilization

PUTTING METAL ON ITS METTLE

Sub-zero refrigeration processing for cold treatment of metals is an important war-time development with almost unlimited future possibilities. Here's one company's experiences with it

By Fred W. Whitcomb

Field Engineer Deepfreeze Div.
Motor Products Corp.

SUB-ZERO refrigeration processing for cold treatment of metals is becoming one of the most important developments brought about as a result of abnormal wartime production in the metal working industry. Today cold treating is being employed, in conjunction with conventional heat treating, for hardening, stabilizing, shrinking and testing of metals and various other materials.

Although still in the experimental state, sub-zero refrigeration has found extensive application in industry and has proved extremely satisfactory for increasing tool life, preventing metal growth with age, in stepping up production in shrinkfit assembly, and for testing instruments and other materials which are used below atmospheric temperatures.

The newness of this development has demanded certainty of two process factors:

(1). That the treatment, which often replaces long period aging of the past, must be precise to meet quality requirements;

(2). That precision of the process must be doubly assured through constant observation and recording of temperatures. To meet one of these requirements and to assure the other, we have made use of an electronic recording pyrometer, the Brown Instrument Co. electronic potentiometer.

Temperatures as low as -120°F . are maintained with our principle of refrigeration, which incorporates a 100 per cent primary freezing surface, resulting in a tremendous amount of heat absorption in relation to the amount of power which is applied. We have also proved the equipment is capable of removing 1,000 B.T.U.'s per hour when the material is immersed in a convection fluid. The metal working industry has found that this rapid rate of heat absorption has resulted in faster shrinking, testing and treating of metals and has also resulted in considerable economies.

Although the uses to which cold treating practice can be applied successfully are almost unlimited, it is finding its greatest use as a means of hardening and stabilizing tool and die sticks, gauge studs, etc. Uniformity of hardness is improved and hardness is often increased. Retained

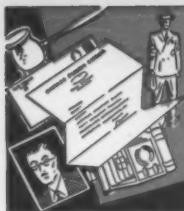
austenite is eliminated through the complete transformation of austenite to martensite, which occurs during the sub-zero treatment.

The life of drills, cutters, gears and similar equipment is increased as much as 100 per cent through the cold treating process and its instrument controlled temperatures, allowing longer use between sharpenings. Precision instruments and gauges, formerly aged for several years before use, are now stabilized by cold treating in a matter of hours. Heat and press for assembly of male and female parts has been outmoded by the shrinkfit assembly method.

In shrinkfit assembly, the male portion is subjected to extreme cold, causing shrinkage; it is then inserted into the female portion where it warms to atmosphere temperature and expands to its original size. The result is a tight fit. Numerous aircraft parts, such as radio receivers and transmitters, also oxygen masks and operating instruments, often affected by atmospheric pressure of extreme cold of high altitudes, are being tested by the Deepfreeze process.

The use of the Brown electronic recorder is particularly desirable

Continued on page 43



About People

Arthur B. Schellenberg has resigned as president of Alco Valve Co., St. Louis, effective Sept. 1. He intends to remain in the refrigeration industry, but at present is making no definite announcement of his future plans.



No announcement has been made as to his successor at Alco.

Mr. Schellenberg was named president of Alco following the death of J. L. Shrode in 1938. He has been with the company since 1929. At the time he became president, Alco employed approximately 90 people; today it employs over 500.

Mr. Schellenberg, who has just completed a term as president of Refrigeration Equipment Manufacturers Association, also is a member of the General Industry Advisory Committee of War Production Board, and a member of the executive committee of A.S.R.E.

Richard S. Dawson has announced his resignation as vice president of Alco Valve Co., to be effective before Sept. 15. Except to state that he intends to continue in the refrigeration industry, he made no announcement concerning future plans.

R. C. Robertson has been appointed manager of the eastern district office of Superior Valve & Fitting Co. He will handle sales in the eastern states from Maine to North Carolina, taking in the eastern half of New York and Pennsylvania.



During his 19 years of experience in the refrigeration and air conditioning industry, he has been com-

mercial regional supervisor for York Corp., dealer supervisor for Carrier Corp., and more recently in the Airtemp Division of Chrysler Corp., as assistant general sales manager and New York manager of the national accounts department. He will headquarter at 60 E. 42nd St., New York City.

Appointment of three new branch managers and the opening of a new



Mr. Sanders



Mr. Smith

branch office in Milwaukee has been announced by Penn Electric Switch Co.

E. M. Smith, formerly manager of the company's Detroit office, has been transferred to the home office and



Mr. Kyle

will be manager of the Goshen factory sales branch covering northern Indiana, part of western Ohio and southwestern Michigan.

G. Orr Sanders has succeeded Mr. Smith as manager of Penn's Detroit office. Mr. Sanders was formerly manager of the Capicolaire Division of U. S. Radiator Corp., in Detroit, and previously was factory representative for Mayflower Air Conditioners.

E. S. Kyle has been named manager of the company's new branch office at 1141 N. Van Buren St., Milwaukee. Before joining Penn, Mr. Kyle was in the experimental department of Cleaver-Brooks Co., Milwaukee.

R. A. Buescher has been appointed manager of the Great Lakes district of the General Electric Co.'s appliance and merchandise department. With G-E since 1935, he has most recently been an expeditor on war materials for the department.



J. D. (Joe) Merkle, formerly assistant sales manager of Ranco, Inc., has opened an office in Room 306 South Side National Bank Bldg., St. Louis, to serve the mid-

western territory for Ranco products. The office is located at 3606 Gravois Ave.

Mr. Merkle is well known to the refrigeration trade, having been associated with Ranco for the past 17 years.

Harry A. Feldbush, formerly works manager of the Holyoke, Mass., plant of Worthington Pump and Machinery Corp., has been named vice president in charge of engineering for the entire corporation. His duties cover engineering activities of all works and domestic subsidiary companies. His headquarters will be at the general offices in Harrison, N. J.

Ralph M. Watson, formerly chief engineer of the centrifugal engineering division, has been appointed assistant to Mr. Feldbush.

As a means of improving its methods of distribution in the Pacific



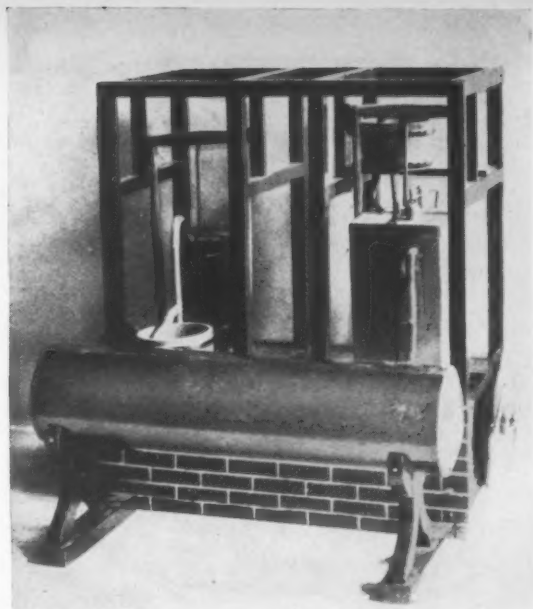
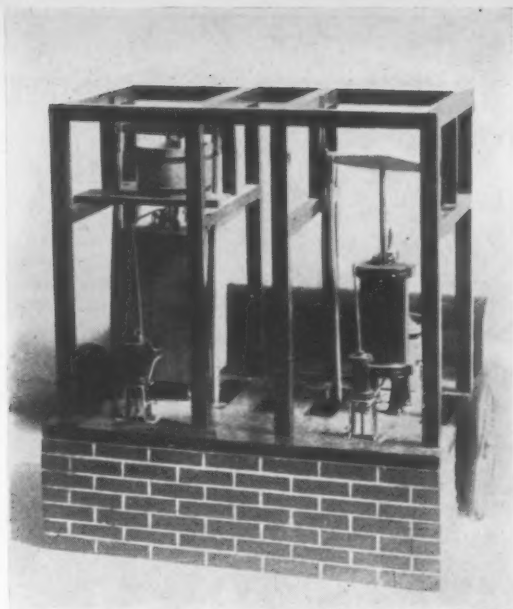
Mr. Swaton



Mr. Norris

Coast area, Kerotest Mfg. Co., Pittsburgh, has announced the establishment of a new warehouse at 3311 East Slauson Ave., Los Angeles, with **J. A. Swaton** as district manager for steel valves and **J. A. Norris** as dis-

Continued on page 58



Two views of Dr. John Gorrie's original ice-making apparatus. (Photos from N. Y. Public Library)

AMERICA'S FIRST ICE-MAKER

By Vincent Edwards

IT IS only in these latter days of air conditioning and refrigeration that Americans have made up for their sad neglect of a genius. If one goes today to the town of Apalachicola in Florida, one will find an imposing monument in the public square. The name inscribed there—"Dr. John Gorrie"—may not be familiar to most people, but it honors the first man on official record in the United States to invent a machine for making artificial ice.

The memorial to the all-but-forgotten inventor was erected by the Southern Ice Exchange in 1900. Only four years later the state of Florida unveiled a statue of the Apalachicola physician as one of its two honored citizens in Statuary Hall in the Capitol at Washington. It seems a pity that all this recognition came so late, for Dr. Gorrie died of a broken heart more than 90 years ago.

John Gorrie started out in life with brilliant prospects. After getting his preliminary education in his native city of Charleston, the handsome, dark-eyed youth moved on to the College of Physicians and Surgeons in New York, where he was graduated in 1833.

★ ★ ★

**Here's the story of a man
who braved ridicule to bring
his neighbors a truly great gift
— mechanical refrigeration**

★ ★ ★

For a few months he practiced medicine in Abbeyville in his native state. Then, the 30-year-old doctor moved farther South and opened an office in Apalachicola. At the outset he must have made a very favorable impression, for he developed a flourishing practice in the community.

It wasn't long before the townspeople asked him to take a hand in public affairs. For four years Dr. Gorrie served as Apalachicola's postmaster. Meanwhile, too, in 1835, he had been made a member of the town council. Finally, in 1839, came the highest honor—his election as mayor. But the scientifically-minded medico soon discovered he wasn't cut out for a public career. His growing interest in another field led him to abandon politics altogether.

The weather can become terribly hot in Apalachicola in midsummer,

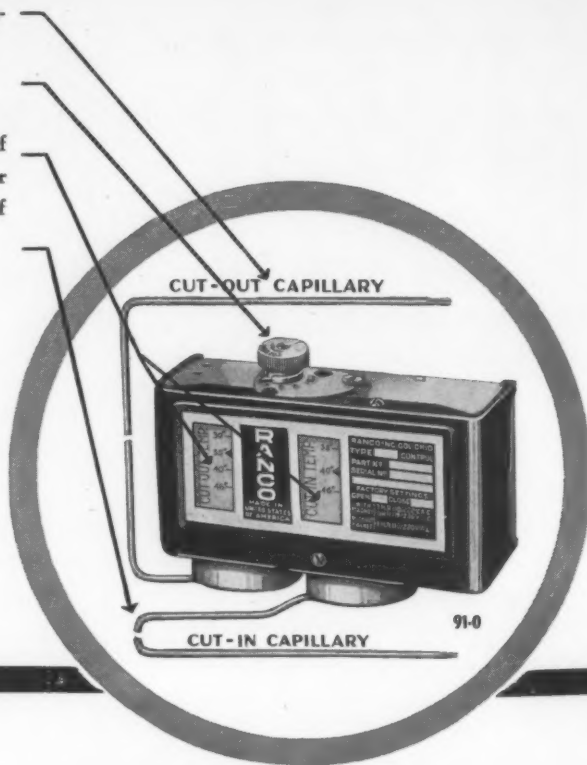
and as Dr. Gorrie attended his fever patients, he wondered if something couldn't be done to relieve their distress. Moved by sympathy, he asked himself why their rooms couldn't be cooled by some artificial method.

Working on a special design of his own, he developed it, step by step, and then he presented it to Apalachicola readers in eleven successive articles in the local weekly. So far as is known, the idea of air conditioning had never before been considered in America. Dr. Gorrie's plan offered vast possibilities, but it does not seem to have created much of a sensation when he made it public.

It may have been due to the fact that the self-absorbed physician was already looked upon as "slightly cracked" by the neighbors. He wasn't going out on "cases" any more than he had to, so strong had become his interest in his scientific theories. He now had a laboratory where he began to experiment with refrigerating contrivances. Finally, he gave up his doctoring altogether.

The townspeople may have smiled, but John Gorrie felt he was really getting somewhere at last. From the problem of artificially cooling air,
Continued on page 55

- Assures uniform fixture temperatures.
- Uniform high relative humidity.
- Completely automatic defrosting of the coil regardless of weather or load conditions or a cold location of the compressor.



THESE *EXCLUSIVE* FEATURES make RANCO 91-0 TWO-TEMPERATURE CONTROL *OUTSTANDING*

Sturdily built of finest materials, checked progressively in each step of manufacture by precision inspection, this Ranco Control is a superbly sensitive and accurate instrument capable of rugged service.

For use on single unit or multiple unit systems.

For natural convection or forced convection units.

For Walk-in Coolers, display cases, florists boxes etc.

Win the good will of your customers by installing this Ranco Control.

• • •

Ask your Ranco Jobber about this and other Ranco Commercial and Domestic Refrigeration Controls.

Ranco Inc.

COLUMBUS 1, OHIO

"Let's share our knowledge—exchange our experiences"

Here's how

New Training Aids

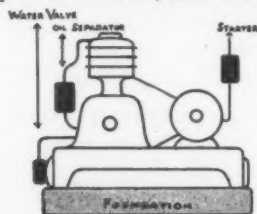
Postwar aids in training refrigeration service men are available in the form of 16mm. films covering general principles of refrigeration, household servicing, and commercial servicing.

These films will serve as a practical aid in any training program, as they were produced under the direction of practical refrigeration service men in California. Accompanying each film, of which there are 16, is an instructor's manual. Films are not intended to be complete training, but will supplement any training program.

They are available through visual education dealers, or directly from Castle Films, Inc., 30 Rockefeller Plaza, New York 20, N. Y.

Tomorrow's Equipment

Most contractors have been so busy keeping existing refrigeration equipment in operation that little thought has been given to the advancement of design in the refrigeration industry. By and large, refrigerating equipment to the present time has been good equipment. However, there are many



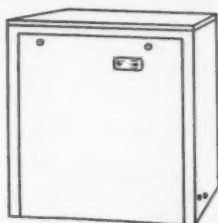
Equipment Then . . .

opportunities through new design to gain better operation, more eye appeal and better public acceptance, and with these advantages actually reduce the cost to the consumer.

The companion illustrations entitled "Then and Tomorrow" clearly

Edited by
Warren W. Farr

show the improvement in eye-appeal. The modern unit has all of the advantages of the previous unit, plus a vermin-proof cabinet that is easily ac-



. . . and Tomorrow.

cessible for servicing, has no complicated gadgets exposed for the customer to tamper with, and may or may not have the control accessible to the customer.

In addition to beautifying the unit,

the all-metal, soundproof cabinet will keep the delicate relays and compressor parts away from excess dust and dirt. This cabinet design is adaptable to either sealed or open type units. It will be less difficult to locate the postwar unit, because there will be no danger of injury to people by exposed moving parts and this attractive cabinet from the appearance standpoint can be located many places where previous units would have been an eye-sore.

One's first impression would be that such a cabinet would increase the cost of a condensing unit. However, it is possible to eliminate the compressor bases, belt guards, and to use a portion of the cabinet construction for mounting the component parts of the condensing unit, eliminating many brackets and expensive unit bases. Surely, such equipment will reduce sales resistance in the commercial refrigeration picture.

HELP WANTED

WANTED: From refrigeration installation and maintenance contractors who are readers of **THE REFRIGERATION INDUSTRY**, ideas on how to do routine jobs more easily and quickly.

We want to pass these time and trouble-saving ideas on to others, so that they can benefit by them. Shop equipment, installation methods, servicing kinks . . . tough or simple, long or short, plain or fancy . . . that's what we want.

Send them to **HERE'S HOW**, c/o **THE REFRIGERATION INDUSTRY**, 812 Huron Rd., Cleveland 15, Ohio. We'll pay you \$5, or a copy of *Althouse & Turnquist's "Modern Electric & Gas Refrigeration,"* for each suggestion published.

And More Coming

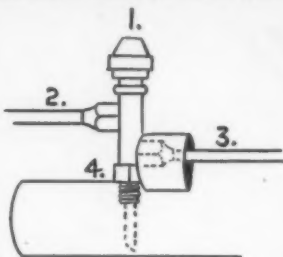
Among the uses of low temperature refrigeration—down to minus 120° F.—are quick-freezing foods, drying blood plasma and penicillin, testing engines, guns and radios under stratosphere conditions, super-hardening tool steels, aging gauges and castings, shrinking tight-fitting parts, liquifying gasoline and natural gas, and various kinds of research and process work.

Skin Care in the Refrigeration Shop

Unless precautions are taken, troublesome skin injuries may result from the constant handling of some of the commonly used organic solvents, including gasoline, naphtha, benzene, turpentine, trichlorethylene and carbon tetrachloride.

THE SERVICE MAN'S DEPARTMENT

I HAVE found in trying to locate a leak with a Halide leak detector when there are multiple connections, a piece of sheet rubber



6" x 4" may be used to advantage. A piece of old inner tube would be suitable.

For example, after folding the rubber around the suspected leak at No. 3, apply the tube under and over the connection. If nothing shows under the joint you can be certain the gas is escaping from one of the upper connections, and repeat the trial on the next suspect.

H. E. Anderson, Haverhill, Mass.

These injuries, as a rule, consist of a local reddening of the skin, followed by inflammation, blisters and later, chronic sores. When such conditions develop, they require treatment by a physician, but with proper care they may be prevented.

Whenever possible, work should be arranged so that workers do not come into direct contact with solvents; if this cannot be done, gloves, sleeves and other protective clothing may be provided. However, care must be taken to see that this clothing is of a material that is not attacked by the solvent in use.

In cases where the use of gloves is objectionable, the hands should be covered before work with a protective cream. Several proprietary creams are available, each adapted for use with certain types of solvents.

After work the hands should be cleaned with a mild soap containing, if necessary, a synthetic detergent and an abrasive that softens in water, such as corn meal. Strongly alkaline soaps, sharp abrasives, and solvents should never be used. After washing, it is well to apply an ointment consisting of 50% cold cream and 50% lanolin. Persons abnormally sensitive to solvents should be given other work in departments of the shop.

Cutting Capillary Tubes

Extreme care must be taken in cutting a capillary tube, as any chips or rough edges would restrict the ex-

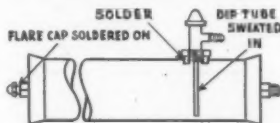
tremely small inside diameter. This operation can best be accomplished by scoring the entire circumference of the tube with a three-cornered file to a depth of approximately the wall thickness, and then bending it back and forth gently until it breaks. This will leave the inside opening clean, and with a full diameter.

Silver Solder Flux Remover

A new solution is available, known as Di-Lac, which will successfully remove silver solder and brazing flux and also carbon deposited on compressor parts. This solution is offered to the trade by the Diversey Chemical Co., Chicago. It has been used successfully when mixed one part Di-Lac to four parts of water. The solution is most effective when held at a temperature of 190°, and the average cleaning time is about 15 minutes at this temperature.

A WHILE back, I needed a small upright receiver for a small household job. As there was none at hand and none available from the local supply houses, I manufactured one for myself from a large dehydrator shell and mounted it in a horizontal position along the back-side of the unit base.

I first selected an angle valve



and sweated a short piece of 1/4" copper tube into the bottom of it to act as a dip tube. Next, I cut a hole in the top side near one end cap and soldered a shoulder bushing into it, then soldered a flare cap on the connection at the far end. After screwing the angle valve and dip tube into the shoulder bushing, the whole assembly was tested at 250 lbs. pressure, bolted to the unit base by means of two short steel straps and two pipe clamps, connected up to the system and a coat of paint sprayed on.

This home-made receiver allowed the job to go back into operation the same day, and has been in service for several months and has given excellent results.

Leigh W. Collins, Buffalo, N. Y.

Frost-Ups May Be the User's Fault

"It frosts up too fast," the user complains. "It seems no time after I defrost until the freezer is covered with frost again."

CHECKING MOTOR CONDENSERS

MANY motor starting condensers taken from motors have no identification marks on them, or if they had, have been obliterated through age. A simple way to check them for capacity is to obtain an AC ammeter, preferably with a 0-10 amp. scale and put it in series with the condenser to be tested. Reading the ammeter quickly, the reading can then be used in the following formulae:

$$M.F.D. = \frac{\text{Amperes} \times 2640}{\text{Voltage}}$$

This will be accurate enough for all field procedure.

Elmer H. Wiedwald, Cleveland, Ohio

Heavy frost on the evaporator may mean that the door of the refrigerator is opened too much. Every time the door is opened, warm room air rushes in. The moisture in the air condenses on the evaporator and freezes.

If the refrigerator has a leaky door gasket, there is a steady leak of warm air into the cabinet. You can check this with a piece of wrapping paper. Fold it, put it under the gasket where it seems most worn, and try to pull it loose when the door is closed. If it comes out easily, the gasket is loose and should be replaced.

Hot foods in the refrigerator may be another cause of heavy frost. The heat travels to the evaporator, the moisture in the air condenses and freezes on the evaporator. Food in open dishes also can cause over frosting; the moisture from the food settles on the evaporator and freezes.

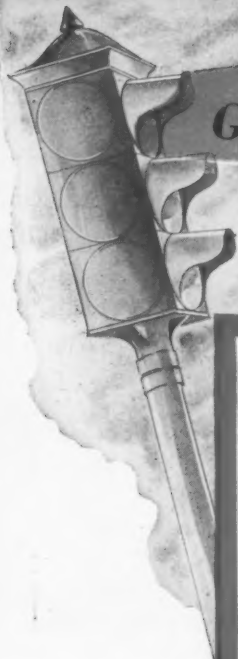
When you have a complaint of too much frost, check the user's practices. Many times it is what she does that causes the frost.

Looking for Trouble: No. 1 High Water Consumption

If your check shows that the water cooled unit is using too much water, here are the points to check:

1. High head pressure.
2. Regulating valve not properly adjusted.
3. Condenser coils dirty or limed.
4. Defective regulating valve.
5. Water temperature too high.





GREEN LIGHT Coming Up!

*...And a New Opportunity For
Refrigeration Dealers*

It's smooth sailing to Tokyo now, with green lights all the way for fighting Yanks and their valiant allies. To the heroes who fell, and to those who have survived, a grateful world pays tribute.



And now, for American civilian industry, too, the green light is coming up. To the Albert H. Bromann, Jr. organization, that green light means quick reconversion to production of the following equipment:

Custom Built Products

- Complete Cooling Rooms
- Cabinets for Industrial and Commercial Freezers

Standard Products

- Cold Storage Doors
- Direct Drawn Beer Dispensers

No Albert H. Bromann Jr. product will be sold direct to users. All our equipment will be sold only through recognized, established refrigeration dealers.

If you are interested in handling one of the outstanding quality lines in the post war refrigeration field, on a basis that assures substantial and protected profits, we cordially invite you to get in touch with us.



ALBERT H. BROMANN JR.

GENERAL OFFICES: 4822 WEST CHICAGO AVENUE • CHICAGO 51, ILLINOIS

There's *Gold* in Them

By Warren W. Farr

MANY refrigeration systems have become obsolete during the war period. Some are just plain worn out, while others simply will not do a good job when compared with modern equipment.

All during the war period, conservation has been a national theme. Food had to be conserved because of shortages resulting from demands of the armed services and our allies. At the same time, restrictions on civilian production of refrigeration equipment made it imperative that existing systems be kept in service in as many cases as possible.

In the highly competitive postwar period, conservation will continue to play an important role in the successful merchant's operation. Mark-ups on produce, meat and other foodstuffs will not provide a sufficient spread to write off quantities of spoiled and unsalable merchandise. Adequate refrigeration will have to be provided so that foodstuffs can be stored in prime condition until they are sold, without excessive dehydration or loss of color and consequent eye-appeal.

The successful merchant will scrutinize closely the cost of operation of his refrigerating equipment. He will pay particular attention to his electric bill, water bill, and repair charges. In order to be successful, he will have to get his money's worth in all of these items. Worn out obsolete equipment will be a stumbling block to the postwar merchant unless modern replacements are made.

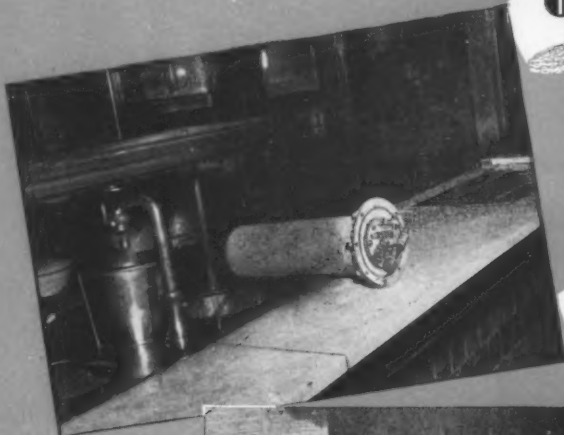
Mr. Refrigeration Contractor, it is your obligation to tell the merchants who are your customers this story, and see to it that their equipment is delivering to them all of the operating costs that they are putting into it.

In many cases, it will be necessary for you to modernize the refrigerating systems of existing fixtures, as the old fixtures may be built into the customer's premises and until complete remodeling can be effected it would not be desirable to remove them. In

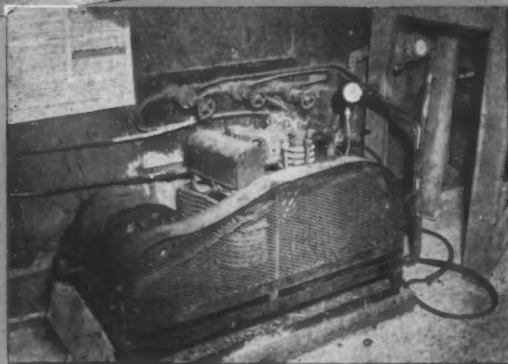
Over-worked, obsolete equipment can but sooner or later there's bound to be to the alert refrigeration contractor,



OLD



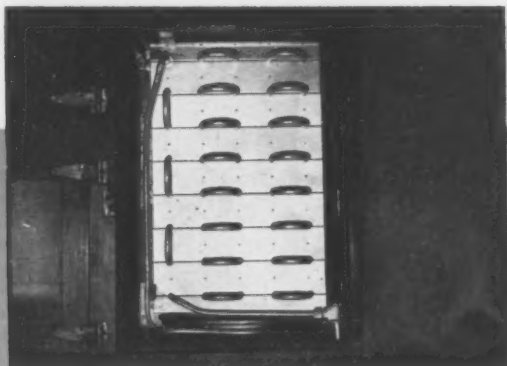
OLD



OLD

There ILLS!

patched when conditions demand it, trouble! And trouble spells opportunity this "Before and After" story proves



NEW



NEW



NEW

reconditioning old fixtures, the contractor's shop facilities will come into play. You may be required to fabricate, in part, the new refrigeration system.

To illustrate one type of job recently reconditioned by a refrigeration contractor, we have selected a modernization of dining car equipment originally installed in 1929. The refrigeration problem in this dining car consisted of cooling cooked and uncooked foodstuffs and chilling drinking water at two water stations.

The original coil installation in the reach-in refrigerator consisted of a flooded coil, with vertical copper fins soldered to the refrigerant tubing. Center of the coil section contained six ice trays, which were never used during the life of the installation. The customer suffered extreme losses due to dehydration, and further food spoilage due to lack of temperature at times when the coil was too heavily frosted, and loss of all refrigeration when the equipment was shut off for defrosting periods. Close inspection of the accompanying photograph of this equipment show a number of dents made by an ice pick which the customer often used in an effort to speed the defrosting operation.

This original flooded coil was charged with 9 lbs. of SO_2 and during various service operations and occasional emergency leaks the dining car was forced to turn patrons away until adequate repairs could be made.

This coil was replaced with a modern direct expansion fin coil with the ability to provide adequate temperatures and maintain humidities that will not dry out products stored inside the refrigerator. Adequate coil surface was provided in this instance so that minimum temperatures could be maintained and still operate the coil on a defrosting cycle. The illus-

tration shows the expansion valve mounted in the upper left-hand corner, in a protected area of the box. Adequate drier coil has been installed in the suction line so that the refrigerant can be superheated within the refrigerator to prevent excess condensation outside of the refrigerated space.

Water Stations Modernized

The two water stations, one at either end of the diner's counter, were equipped with two flooded coils, consisting of a float and a float chamber immersed in a sweet water bath. A snap action valve was used to prevent excessive ice formation. Each of these coils contained $4\frac{1}{2}$ lbs. of SO_2 , increasing the hazard of odor in the customer's premises just 9 lbs. more. These flooded coils had been very ineffective, due to the fact they operated most of the time in an oil-logged condition, as it was difficult to get good oil return through the constant pressure valve, as gas velocities were very low.

These coils were replaced with two direct expansion coils of the continuous tube type, containing 50 feet of $\frac{1}{2}$ -inch tubing shaped and silver soldered through a $\frac{3}{8}$ -inch brass plate adapted to fit the old flood coil header. Ample surface was provided on these coils so that they might operate at approximately the same temperature as the reach-in coil. A constant pressure valve was provided in the suction line to balance the system should the water baths operate at too low a temperature. Adequate oil return was insured through the use of single continuous tube coils. Since this type of coil was not readily available on the market, and was of a tailor-made nature, the ones used in this installation were fabricated by the contractor in his own shop.

Built-In Fixtures

Both the reach-in unit and the water stations in this particular installation were built-in equipment, and could not readily be replaced. However, all of the hardware and gaskets were either replaced or repaired as part of a thorough "re-modeling" job.

The accompanying photographs of the original condensing unit and the new condensing unit need no great explanation. The new condensing unit was photographed prior to the con-

nection of the new refrigerant lines. However, after the installation was completed, there were only 10% as many places for leaks as there were in the original system. The new installation is much more accessible for service, and the motor size was reduced from 1 H.P. to $\frac{3}{4}$ H.P. by virtue of the fact that capacity was increased by raising refrigerant temperatures through proper coiling.

Hazard from odor also has been removed from the customer's premises, the new system being charged with $6\frac{1}{2}$ lbs. of methyl chloride.

Thousands of these inadequate systems are in existence today, and you, Mr. Contractor, need only to tell the economy story of modern refrigeration to receive your share of this business and to build a substantial list of satisfied customers.



J. M. Oberc (left), one of the pioneers of the parts distributing field, discusses merchandising plans on Monitor appliances with Ralph Day, the firm's merchandise manager. J. M. Oberc, Inc. has taken on the Monitor franchise for Detroit and surrounding areas.

Oberc to Distribute Monitor Line

J. M. Oberc, Inc. of Detroit has been selected as a distributor for the products to be marketed by Monitor Equipment Corp. in Wayne, St. Clair, Macomb, Oakland and Washtenaw counties. This territory embraces the Detroit metropolitan and surrounding area.

Monitor Equipment Corp. was formed by a group of distributors, and has contracted to market nationally the home appliances to be produced by 24 factories, as soon as these plants can be converted from war production. The products of these various independent producing elements will be marketed under the "Monitor" trade name.

J. M. Oberc, Inc. was formed in 1933 as one of the first independent refrigeration parts and supply wholesaling firms in the country. J. M. Oberc, head of the firm, declared that the Monitor Home Appliances Division and the Wholesale Parts Division will be operated as two distinct and

completely independent operations, and that there will be added later a third independent commercial equipment division.

Ralph A. Day will become merchandise manager for the company as of Sept. 1, Mr. Oberc declared. Mr. Day, a native of Detroit, was educated in the engineering school at the University of Michigan, and joined Kelvinator in 1927. He has been with that company for 17 years, starting as a retail salesman and becoming successively sales and application engineer, commercial manager of the Detroit branch, and assistant branch manager.

Before establishing his own business in 1933, Mr. Oberc had been with Kelvinator from 1923 to 1929, and from 1929 to 1933 was with F. B. Riley & Associates, manufacturers' representatives in the refrigeration field.

Merchandising plans, now in a formative stage, will be outlined later.

CONTRACTORS

News • Activities • Plans

Selling the Industry To Returning Veterans

Don't overlook the mechanically-minded World War II veteran as a potentially valuable source of manpower which will be readily adaptable to your postwar commercial and industrial sales and engineering activities.

Local offices of U. S. Employment Service are daily making suggestions to these men as to what connections they will make, now that they are out of uniform again. All of us are so familiar with the postwar possibilities of our industry that we may assume

peting for the services of these men; let's get our share of them.

New Commercial Financing Plan by Commercial Credit

Commercial Credit Co. has recently announced a new financing plan to cover deferred payment sales of commercial refrigeration equipment. The plan was formulated in cooperation with the Commercial Refrigerator Manufacturers Association, and equipment manufacturers and dealers.

Some features of the plan include lower purchaser finance rates, 100% advance to the seller, and uniform rates, terms and procedure throughout the country.

McFadden to Handle Seeger in Philadelphia

A. C. McFadden & Co. has been appointed exclusive distributor of Seeger-Sunbeam equipment in the Philadelphia territory. The company, located at 104 E. 21st st., will handle refrigerators, cases and a full line of commercial equipment.

Coast Contractor Making Freezer-Storage Models

W. C. Bradshaw Co., Fresno, Calif. refrigeration contractor, is making a specialized combination freezer and storage unit of 45 cu. ft. capacity to meet the requirements on fruit farms and ranches in his territory. Record fruit crops have necessitated importation of outside labor for these farms,

and extra refrigeration is needed to supply their food storage requirements.

Frozen storage space in the unit is 8 cu. ft., which is held at -5°F. using Dole plates; balance of the space is served by blower and coils. Power is supplied by a Servel ½ H.P. unit. The cabinet is of wood exterior, with fiber glass insulation and sheet metal lining; price, complete, is \$895.

THEY NEED IT

More than 200 industries, including the manufacturers of chewing gum, glass, synthetic rubber, drugs, textiles, paper and printing have found that air conditioning is essential to their work.

Used Refrigerator Price Order Amended by OPA

Maximum Price Regulation No. 139, covering used household mechanical refrigerators, has been amended by OPA to make it "more workable." Refrigerators sold "as is" must have all parts necessary for operation, a point not expressly made in the regulation heretofore.

A consumer selling a used unit to another consumer may meet the guarantee provisions of the regulation by furnishing a written agreement to pay for all parts and repairs needed to fulfill the guarantee, if he himself cannot provide those parts and repairs.

Pricing formula on 1941 and 1942 units, and all chest-type and lift-top models, has been changed; these models now have dollars and cents prices. On 1939 and 1940 models, the \$5 warranty allowed on sales of used units with one-year guarantee is raised to \$10, since these units are no longer covered by the manufacturer's original five-year warranty.

CMP-9A CHANGES

The amount of copper wire that refrigeration contractors may now buy in a calendar quarter for repair purposes has been increased from \$75 worth, or one-tenth of what they used in making repairs in the year 1941 (whichever is greater), to \$150, or one-eighth of 1941 usage, under the latest amendment of CMP Regulation 9A.

The former restriction against the use of new cord and other materials obtained under the regulation for certain types of repair work also has been eliminated.

Direction 2 to the regulation also has been amended to provide that a contractor may use up to only \$25 worth of materials purchased under the regulation to install any unit of new or used air conditioning or refrigeration equipment. The direction formerly limited materials for installation of used equipment only.

the other fellow knows all about it, too.

The chances are he doesn't, so it's up to contractors in each locality to see that he finds out. As a first step, the contractor firms in the local area might be called together, and a census taken as to approximately how many men the industry can profitably absorb, of all types—sales, engineering and maintenance.

Then the nearest U.S.E.S. offices and Veterans Administration placement officials should be given this information, together with a brief review of the opportunities, both present and future, in the local refrigeration and air conditioning field. Industries other than ours will be com-

An access door, big enough to crawl through, makes cleaning of the main supply duct in this air conditioning system quick and easy. Keep features like this in mind in the jobs you are planning to install.



NEWS FOR YOU

We are NOW filling orders for PEERLESS FLASH TUBE COILS DE LUXE FLASH COOLERS

The entire refrigeration industry has been waiting for this announcement.

It marks the passing of priorities, delays and disappointments in serving your customers' coil and cooler needs.

Today . . . right now . . . you can place your orders for the famous *Peerless Flash Tube Coils* and *Peerless De Luxe Flash Coolers* and secure prompt delivery. Our fin coil machines are

in operation, turning out volume production.

New war-born techniques and "know-how" are your assurance of finer *Peerless* quality than ever before.

Send for our new Bulletin No. 100. Bring yourself up-to-date on the exclusive features of *Peerless* coils which have made the name *Peerless* a synonym for *Superior Refrigeration*.



CONDENSERS . . .

Continued from page 19

water and the incoming superheated refrigerant vapor would be at a maximum.

The heat transfer for the rest of the tube would not be so good. The water would have to remain below condensing temperature in order to pick up the latent heat of the condensing refrigerant, and if the water was warmed up to just a few degrees below condensing temperature it would not be possible to cool the liquid refrigerant much below the condensing temperature. In any case, the liquid could not be cooled to a temperature lower than the outlet water temperature.

To make a comparison between the various types of water-cooled condensers, let's take as an example a system in which latent heat to be removed amounts to 20,000 B.T.U. per hour, superheat amounts to 1000 B.T.U. per hour, and the density and specific heat of the liquid refrigerant is such that the heat removed from the condensed liquid amounts to 40 B.T.U. per degree of cooling below condensing temperature. We'll assume an inlet water of 60° F. and a condensing temperature of 80° in each case. The refrigerant inlet temperature may be taken as about 120° or 40° superheated. In Table I:

Case 1 represents probably results for a horizontal shell and tube condenser with the water tube wrapped in one continuous coil around the inside of the shell. The result obtained is not too good, since the liquid is cooled only 5° below condensing temperature, and the water consumption is quite high.

Case 2 shows results for a vertical shell and tube condenser with the superheated refrigerant entering the top of the shell and the water entering the water tube below the liquid level in the shell. The liquid cooling below condensing temperature is greatly improved, with much less water used.

Case 3 shows results for a double-tube condenser with water flow counter to refrigerant flow. The condensed liquid refrigerant is cooled a maximum number of degrees below condensing temperature, and the water consumption is a minimum.

Case 4 shows results for a double-tube condenser that had been hooked

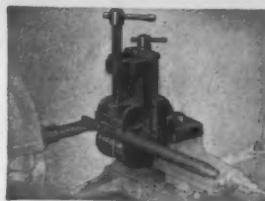
PALMGREN

ANGLE VISES for REFRIGERATION REPAIRS

Refrigeration Repair Shops and Jobbers are finding these two products indispensable in service, profits, success. Difficult angle jobs solved. Quick, accurate set-ups for hand or machine Drilling, Grinding, Filing, Fitting and all other important shop operations. PALMGREN ANGLE VISES are made with 1½"-2½"-4"-6" and 8" jaws. Accurately machined and graduated. Hardened steel jaws, plain or grooved.



No. 606
or
SWIVEL
BASE



Milling Fixture Vise For Lathe

Save time, do milling jobs on lathes. Increase volume. Adaptable for South Bend, Atlas, Craftsman, Sheldon, etc. Graduated vertical feed screw and 360° graduation for vertical angle adjustments. Mounts on cross slide and held by T-Slot bolt. Vise has 2½" jaws, 1-7/16" deep, grooved and plain. Price \$24.75.

Write for Circular No. 609 and Jobber Helps

CHICAGO TOOL AND ENGINEERING CO.

Mfrs. of PALMGREN PRODUCTS for over 25 years.
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up so that the water entered the top of the condenser instead of the bottom. In this case the liquid cooling below condensing temperature is minimum, and the water consumption is up.

Water Valve Use and Settings

The most successful water valves are those which respond to changes in compressor discharge pressure as a means of controlling the rate of water flow. Other variations in water valves consist of temperature-actuated valves which may adjust the rate of water flow according to the outlet water temperature, or simple open-and-shut valves (such as solenoid valves) which open or close as the condensing unit motor turns on and off.

There are many practical considerations about which we might be concerned in connection with water valves. One of these is the tendency to cause water hammer in the water supply lines and other matters such as sticky action, not shutting off tightly, and other mechanical troubles. However, the proper setting is also a matter of concern; improper settings may give indications of low refrigerant in the system and otherwise cause loss of sleep by the serviceman.

Water-Saving One Duty

Where liquid lines are short and the difference in elevation between the liquid receiver and the evaporator is negligible, the problems of the water valve are comparatively simple. Its duty in such cases is to open up at such a pressure that the discharge pressure is kept low enough during compressor operation to maintain compressor load at a minimum. The valve also has a duty to perform in saving water, and should close tight after the compressor stops.

In general, the water valve may be set to open at discharge pressures corresponding to about 10 to 20° higher than the highest inlet water temperature likely to occur. For instance, if the highest water temperature likely to occur is 70° F. and the refrigerant to be used is methyl chloride, the valve should be set to open at about 78 P.S.I., which corresponds to about 84° for methyl chloride (with barometer of about 29.5"). With this setting, when the machine starts the discharge pressure will build up to 78 P.S.I., and the valve

will start to open at 80 to 85 P.S.I. The valve should be open wide enough to let enough water through to maintain the discharge pressure at that point. Then as the machine stops, the water still circulating through the condenser cools the refrigerant to a temperature such that the pressure is reduced, so that the valve will close again.

Obviously, the valve would not operate as intended if the inlet water temperature was 100° instead of 70°; in this case, the water would not cool the refrigerant down to 84° or less so as to reduce condenser pressure and thereby close the valve.

A valve which has a packing to prevent water leakage might also fail to close off, because as much as 30 more P.S.I. change in pressure may be required to overcome packing friction. In such a case, if the valve opened at 78 P.S.I. it would not close until the pressure was reduced to 48 P.S.I. Methyl chloride would have to be down to about 62° F. to reduce the pressure to 48 P.S.I., and of course this could not be accomplished by 70° F. water.

Guide to Settings

Just as a rough guide, suggested water valve settings which should give reasonable compressor performance while insuring good shut-off (assuming no non-condensable gases in system and also that the valve is reasonably free from friction) are as follows:

—P.S.I. Water Valve Settings—			
Max. inlet water temp.	Refrigerants		
	SO ₂	CH ₃ Cl	F-12
50	30	51	
60	40	64	
70	50	80	
80	63	95	
90	78	110	
100	95	135	

Another matter which may influence the setting of the water valve in some systems is the elevation of the evaporator (or evaporators) above the liquid receiver. This is especially important in the case of multiple systems, where any one evaporator may have a very small part of the total load on the condensing unit. In this case the reduction in pressure due to elevation may be important.

In Figure 1 a liquid receiver, a liquid line, a suction line and four
Continued on page 40

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CONDENSERS . . .

Continued from page 38

evaporators are pictured at different elevations. The liquid in the line at A, if we neglect any drop in pressure due to friction, would be the same as in the liquid receiver which has a liquid level the same as at A.

At B, the pressure is less than at A by the pressure that a column of the liquid refrigerant from B to A would exert due to its own weight. If the liquid had the same density as water, the pressure at B would be the pressure at A less the difference in level divided by 2.31, since a column of water will exert a pressure at its bottom of one P.S.I. for each 2.31 feet of depth of the water. For sulphur dioxide or F-12, the effect of liquid head is greater, since both are heavier than water, while methyl chloride is lighter.

Since the pressure at B is less than at A, a lower temperature would be required to maintain 100% liquid at B. 100% liquid cannot be maintained in the liquid line unless the temperature of the line is equal to, or less than, the boiling temperature for the refrigerant at the pressure in

the line. Table II shows the absolute pressure that would exist at points A, B, C, D and E if the temperature at the surface of the liquid in the receiver is 100° F. The table also shows how low the temperature must be to maintain solid liquid at that point.

It will be observed from Table II that the temperature to maintain solid liquid at high levels is especially low for sulphur dioxide. In warm weather, the space through which the liquid line passes is apt to be 70° or more, so that the liquid must pass through the liquid line as a foam rather than as solid liquid. During

the off-period of the machine, the liquid may drop back in the liquid line, so that the evaporator at E level would pass vapor only, as the valve tends to open during the off-period.

If the water valve was set to maintain a condensing pressure of 80° F., the effect of elevation becomes more pronounced as shown in Table III.

From Table III it is evident that if the water valve is set as it might normally be for short liquid lines, the refrigeration would be accomplished with considerable difficulty at high elevations, especially with the heavier refrigerants, such as sulphur dioxide or Freon-12.



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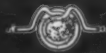
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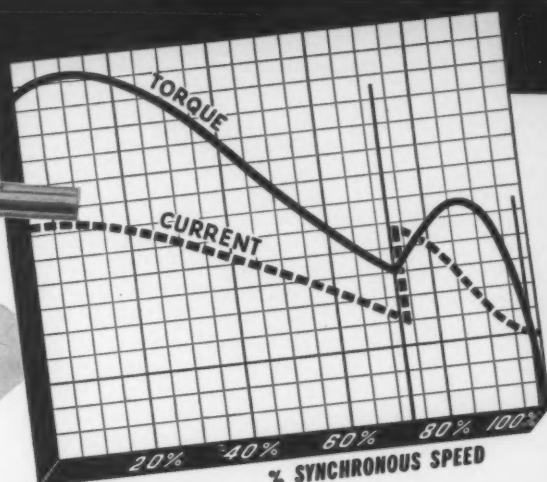


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Wagner type RA motors embody all the important improvements in single-phase motor design. This means that the user of RA motors

gets the best motors for the job with long life and dependability built into every part.

Wagner type RA motors are truly "general purpose" motors because their applications are many. They are particularly suitable for driving machines with high inertia, machines involving excessive friction in starting, and, in general, loads requiring motors capable of exerting high starting-torque with relatively low starting-current.

RA motors are available in $\frac{1}{8}$ to 15 hp; sleeve or ball-bearing; horizontal or vertical; open, dripproof, and totally enclosed; rigid, resilient, or flange mountings.

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others using Dole plates. After working here two months, I received orders to proceed to Arabia.

My work in Arabia consisted of putting in operation a fleet of refrigerated truck trailers. These refrigerated trailers were placed in the rear of the mess halls, the wheels removed and the units then set on stationary supports for use as walk-in coolers. Each trailer consisted of two refrigerated rooms, the center compartment of the trailers containing several control switch boxes. This room had enough switch boxes to accommodate the average power plant. In the nose of the trailer, two compressors were mounted. These compressors were driven by D. C. motors, current for which was supplied by a Kohler power plant mounted in the same compartment. These compressors also had A.C. motors attached to them for use in case A.C. current was available. In the refrigerated rooms, blower coils were used, the blower motors



These double rows of Carrier refrigeration units are being carefully checked to see that the temperature in the storage lockers remains at correct level. (U.S. Navy Photo).

being straight D.C. current. Room thermostats were connected direct to the machines. These were high temperature blowers.

When we inspected these trailers, we found all of the machines to be out of refrigerant. The main cause for the loss of refrigerant was seal leaks. In a few cases, leaks were found at pipe connections made at the oil separators. We had no replacement seals, so it was necessary to lap in the seals and correct the leaking fittings. We then recharged the machines with refrigerant and oil, which enabled us to put the systems back in operation. Upon completion of our work here, we moved on to Egypt.

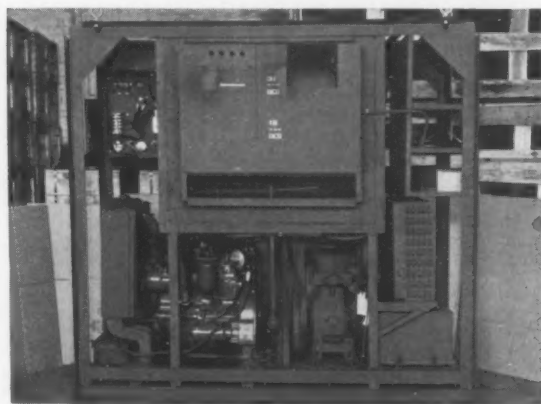
At our base in Egypt, we installed several more ten-ton Freon semi-hermetically sealed units with evaporative condensers. These machines were installed in the hospital buildings at this base. Needless to say, we were quite anxious to get these units in operation, as we were sure the boys would welcome the relief it would bring them, especially those more seriously wounded ones who were wrapped in bandages from head to foot. Our work in that theater finished, I flew home.

After two months at home, I again left the country—this time for the Southwest Pacific. This theatre was a terrible let down after being in the Middle East. I was attached to the Water Transport Division of the Trans-

portation Corps, Small Ship Section, and was stationed at a repair base in New Guinea. We worked on small cargo and tanker vessels. The units aboard these ships were all Freon machines working on a multiplex system. Several of the installations consisted of a water cooler, ice maker and a high or low temperature room connected to one machine.

Many times these ships would come in with their refrigeration system down and their Freon supply exhausted. Freon was very difficult to obtain in New Guinea, and we were always glad when a ship came in using plate evaporators instead of the inch-and-one-half or two-inch pipe coils as this would allow us to conserve on our meager supply of refrigerant. We could charge two or three systems using plates as against one using inch-and-one-half pipe coils. The main cause for the leaks in these systems was the excessive vibration of the machines. One manufacturer mounted the compressor and motor on a one-inch plywood base. This caused a springboard effect when the compressor was running, and brought about broken lines. Another weakness in these systems was the sweat fittings used on line runs. These connections were brazed, and during the brazing of these fittings some were evidently heated too much, weakening the copper and causing eventual leaks.

The greatest problem we encountered over there was burnt up motors. Upon investigation, we learned that the ship's crew would shut down the generator in the evening and would run all equipment off the batteries.



Here's a plug-in refrigeration unit developed by Universal Cooler for use on 650-cu. ft. portable warehouses. It can be used for either frozen foods or normal temperature storage.

By morning, the voltage was dangerously low. Constant operation of the refrigerating units under these circumstances caused several motors to burn up.

I often thought that if these rooms used plate evaporators with a hold-over solution in the plates, the compressors could be shut off during the night and eliminate the burnt up motors, while still holding temperatures in the room. In some cases the ship's crew shut down the compressor when they switched over to the batteries at night, and by morning there would be a 10° climb in cooler temperatures.

It should be remembered that equipment that goes overseas in war time generally is used in places where replacement parts and accessories often are impossible to obtain—therefore the great majority of repairs must be made by hand.

METTLE TEST . . .

Continued from page 25

when the equipment is used above its minimum temperature, for in this case, the temperature varies throughout the dry chamber. Deepfreeze Cascade equipment operates on a constant pressure of the refrigerant in the evaporator and therefore the entering refrigerant is always at the same temperature and the rest of the cold cylinder must be held at a temperature as many degrees higher as is required to provide the necessary temperature at a specific level. Because of this variation in the temperature of the cold cylinder an accurate record of the actual temperature of the material being treated is highly desirable. The temperature can be definitely observed and recorded with a Brown electronic recorder having a thermocouple in contact with the subject to be treated.

The postwar possibilities of cold treating of metals and other materials used in industry are extremely promising. When wartime pressure is relaxed, and there is time for further research and experimentation, cold treating promises to develop to the point where its application in industry will become limitless.

RECONVERSION BEGINS AT ELPECO PLANT

With completion of an Army Ordnance contract under which more than 250,000 huge fragmentation bombs were produced, Electric Power Equipment Corp., has started reconversion of its South Philadelphia plant. Change-over to commercial refrigeration equipment will be made as rapidly as other War contracts are concluded. Reconversion is under the direction of Karl Kummerlen, formerly of Liquid Carbonic Corp.

The company will produce complete lines of condensing units, unit coolers, and expansion valves. It will be known as the "Green Dragon" line. First models of the line have been placed on display.

B.W.I. CROSLLEY OUTLET

Appointment of E. A. Issa & Bros. of Kingston, Jamaica, British West Indies, as distributors for Crosley Corp. for Jamaica has been announced by J. W. DeLind, Jr., director of exports.

SEPTEMBER, 1945

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WEATHERHEAD OUTLINES DISTRIBUTION POLICY

Policy of the Weatherhead Co. for distributing its line of valves, fittings and other products for the refrigeration industry will follow a pattern similar to that used for the company's automotive and aviation products, J. A. Strachan, refrigeration sales manager, has announced.

Under this policy, wholesale distributors will be appointed in various sections of the country to serve their immediate territory.

"The Weatherhead Co. has been distributing various of its products through jobbing outlets for quite a number of years, and its experience has been that distributors acting as warehouses and being in a position to sell jobbers and other classifications of trade within their territory is the most economical way to distribute its products," Mr. Strachan's statement said.

"The wholesale distributor will be placed in a position to sell jobbers in the territory at exactly the same prices as these jobbers would receive if their purchase orders were forwarded direct to Cleveland. In this manner, the jobber in the territory



FRIGIDAIRE'S FIRST—E. R. Godfrey, Frigidaire general manager, admires the first household refrigerator produced by the company since 1942. With him are Delbert Neal, one of the men who built the first household refrigerator, and Shirley Krueger, daughter of a Frigidaire plant superintendent. Scenes like this are typical of the household refrigerator field nowadays.

who desires to handle Weatherhead products will be in a position to obtain considerably better service than having to wait for direct factory shipment.

"The wholesale distributor will also be in a position to sell and solicit business from certain manufacturers and give these manufacturers the service which they have not had in

the past, especially on their spot requirements, without any penalty of price.

"We realize this is quite a departure from the present manner with jobbers in the refrigeration business in the past, but we believe it is a step in the right direction to further the distribution of our products and render our customers a definite service."

G-E CENTERS HOUSEHOLD PRODUCTION AT ERIE

General Electric's postwar refrigerators will be completely manufactured and assembled in the company's Erie Works, reports H. L. Andrews, vice president in charge of the G-E Appliance & Merchandise Department.

Before the war, production was split. Cabinets were made in Erie while refrigerating units were made in Schenectady, N. Y. Final assembly was at Erie. Both cabinets and mechanisms now will be built at Erie and then assembled for shipment.

SERVICE FIRM MOVES

Bedford Refrigeration Service Co., Brooklyn, N. Y., is now located in larger quarters at 9120 Church Ave.

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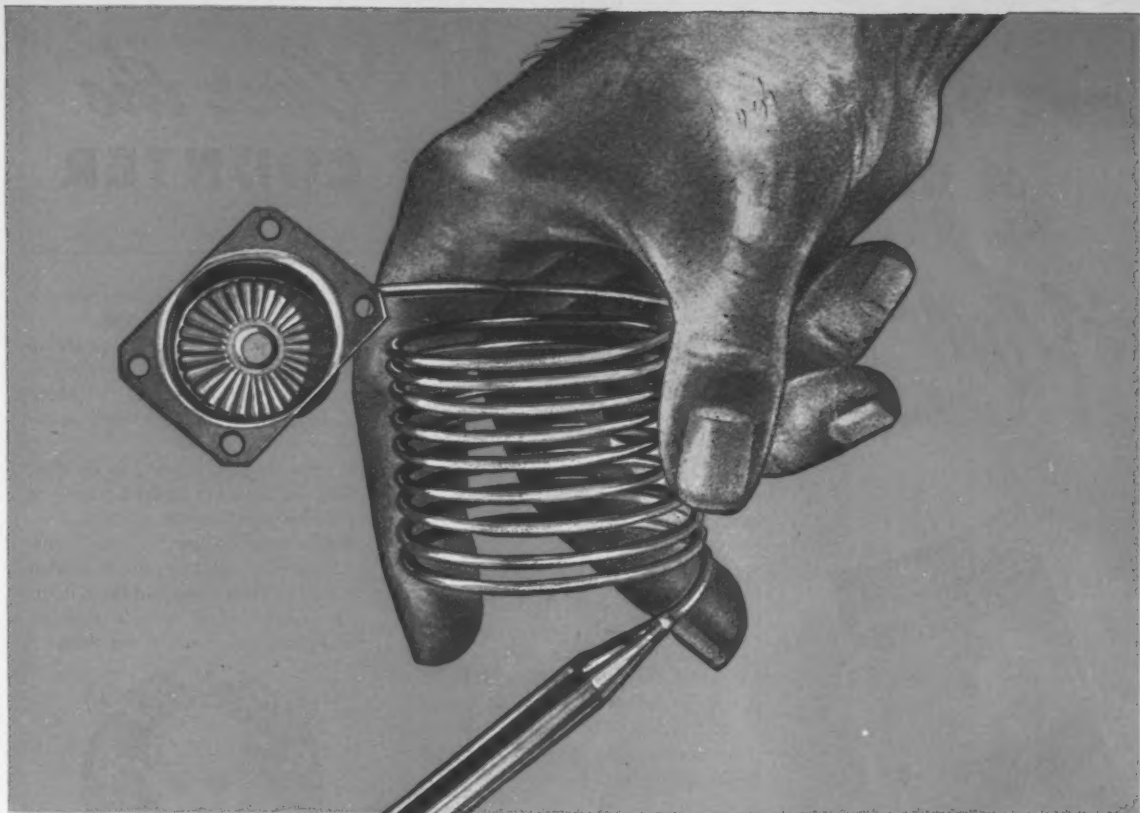
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In view at left, the liquid charge of the capillary has expanded with a rise in temperature. This positive force moves the diaphragm outward and causes the switch to function.



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Over the COUNTER

JIM: This last trip I made around the territory calling on our trade has convinced me more than ever that it is going to be decidedly to our advantage to carry a complete line of equipment items for our service men customers just as soon as the manufacturers have this equipment available for sale.

FRANK: *What items are you planning to sell, Jim?*

JIM: It looks to me as though we would have plenty of calls for most all of the regular popular packaged goods items. For instance, last week, when I called on Bill Williams, he told me that he has any number of his good commercial customers who were talking to him about buying home freezers just as soon as they are available.

Bill says that he's made it a practice to talk to all of his commercial accounts about refrigeration of all types, both for business and the home, and he finds that nearly every food merchant customer he has is interested in refrigeration for frozen foods both for his store and in a good many of cases, his home too.

FRANK: *I think you're right, Jim. I know quite a number of the boys selling household refrigerators tell me that they have listed any number of customers who have units which these boys have been nursing along for the past two or three years. Now all of these customers have talked to them about buying new refrigerators as soon as they're to be had.*

A good many of the customers will buy these refrigerators from their service men because of the confidence these fellows have built up by keeping their old refrigerators running all through the war period.

JIM: It looks as though nearly all of our service customers are going to get their share of appliance business, and it's up to us to have this

material available for them when it comes back on the market.

FRANK: *Are you planning to set up a display of household refrigerators, home freezers, drinking water coolers and such items in the front of the store?*

JIM: No, we're not going to do that. First of all, we're in the business of jobbing parts and supplies and we don't want to attract retail customers into our store, which is what would happen if we had these items on display where people walking along the street could see them.



FRANK: *You're right about that, Jim. Then there's another angle to this thing. The manufacturers we now represent all feel that we are definitely pushing the parts business, and a good many of them would become skeptical about just how we are planning to run our business postwar if they saw a lot of appliances on display in the store.*

JIM: That's the way I look at it. After all, in selling appliances, we are only going to act as wholesale source of supply for these items, the same as we have always done with accessories and parts. It's up to our customer to do the selling, and there's no reason why we should display this equipment up in front and have a lot of would-be buyers coming in to look at it and then having to tell them that they'll have to go to their dealers to make purchases.

FRANK: *But how do you feel about carrying a stock, and how are our*
Continued on page 48



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• Accessories*

KEROTEST MANUFACTURING CO., PITTSBURGH, PA.

OVER THE COUNTER . . .

Continued from page 46

customers going to show prospects these items if we have no display?

JIM: Here's how I look at that problem, Frank. I realize that our servicemen customers are going to have to show a lot of their customers models of the items that they are interested in before they can sell them, even though the pictures of the models will be available and most of their customers will have a lot of confidence in them.

FRANK: Then you'll have to have a display. How'll you set it up?

JIM: I have that all figured out. You know that corner of the store back near the shipping door where we have been stacking empty shipping crates? Well, I'm going to build a room back there about 10' x 15' with just one door, no windows, put some good electric lights on the wall and ceiling, fix the room up pretty well with a rug on the floor and the interior walls decorated and have models of all the items we plan to sell lined up in this display room.

FRANK: That sounds O.K. as far as set-up is concerned—but how will the customers get to see the models they are interested in?

JIM: When one of our customers has a prospect for household refrigerators, home freezers, drinking water coolers, self-contained air conditioning units or any of the

Although no Philco refrigerators have been manufactured for more than three years, the prospect of getting one in the post-war period sold \$90,000 worth of E bonds in a recent war bond auction held in Honolulu with the cooperation of the Hawaii war finance committee. The post-war refrigerator, to be delivered when available and permitted by government regulation, was donated by Nylen Bros. & Co., Ltd., Philco distributor there.

various items, he'll bring his customer down to our place and we'll give them access to this display room. Our customer will take his prospect into this room where all these various units are on display, show them to him, and handle his own sales work. We'll just provide the setting.

FRANK: I see what you mean—that ought to work out O.K. Are you

planning to put price tags on the products?

JIM: That's what I'm figuring on doing—setting up a retail price and putting tags on all the items so that our customers will know how to talk to their prospects when they are showing merchandise and will know what price to give them.

We're not going to have any part of service on any of the equipment that is sold. This will be a matter between our service men customers and the user. Our customers make installations and handle service as their regular business and this would naturally become a part of their program.

FRANK: I get the point. Since our customer handles the service, that lets us out.

JIM: All the equipment manufacturers give a warranty against defects in material and workmanship—and between the manufacturer taking care of his warranty and our customer handling installation and service, we'll keep our hands clean and retain our regular function of wholesale distribution, without any strings tied to it.

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Investigate O-Kay plates—the finest cooling devices available to the refrigerator industry. Ideal for freezer cabinets, storage rooms, salad pans, milk coolers—all low temperature applications. Write Kay, today!

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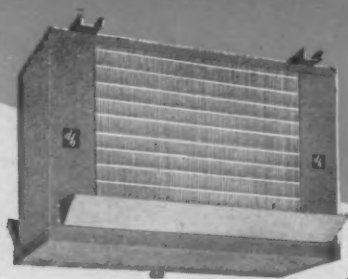
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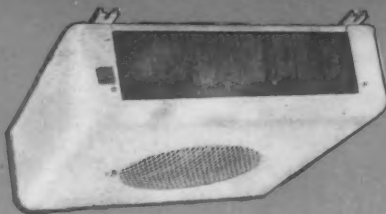
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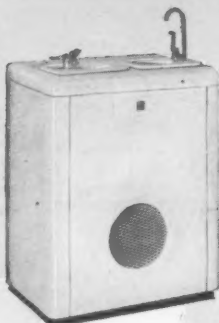
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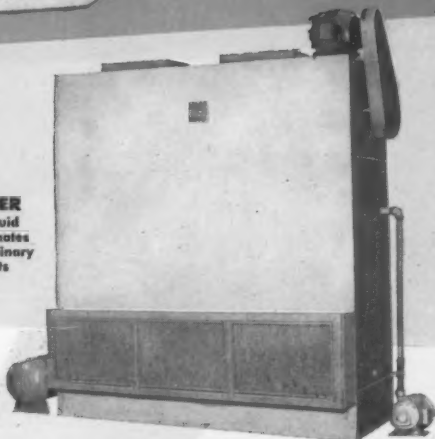


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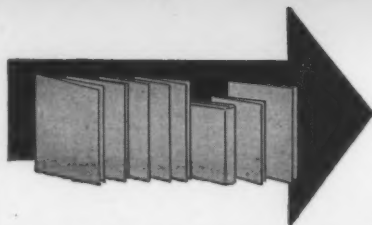


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Useful Literature

The publications featured on this page were written by experts. They are **FREE** publications. To obtain these write to **THE REFRIGERATION INDUSTRY, 812 HURON ROAD, Cleveland, 15, Ohio**. If there is some delay in receiving the material requested, please understand that this is due to our operating with a minimum staff. We shall put through all requests as rapidly as possible.

194—T-Ring Packing . . . An eight-page catalog issued by The Weatherhead Co. on its new T-Ring packing, a hydraulic packing that does away with extrusion damage. Describes how packing operates, shows various installation methods.

195—Peelable Plastic Film . . . A 16-page illustrated book, issued by Better Finishes and Coatings, Inc., describing use, properties and technical data on the new "Liquid Envelope" peelable plastic film, widely used as a protective coating on war goods and believed to have many peacetime applications.

196—Vibration Control . . . A folder issued by Vibration Control Co., describing the rubber mountings which it makes for all types of machinery applications. Advantages of cushioning equipment against excessive vibration are outlined, standard and special units described.

197—Controls . . . Bulletin R-260-D, an eight-page folder issued by Penn Electric Switch Co., containing information on the new series 260 and 261 controls for refrigeration. Includes pictures and diagrams on use of these controls in low temperature household and commercial cabinets.

198—Fluxes . . . A chart, available from Krembs & Company, listing the proper type of "Fluxine" fluxes to use for various types of metal-joining applications.

199—Leak Tracer Compound . . . Preliminary broadsides on "Trace", a new leak tracing fluid developed by Highside Chemicals Co. Tells what it is, how it is

used, superior points, how it is sold, amounts recommended, etc.

200—Ball Bearings . . . Bulletin No. 105, issued by the Bantam Bearings Division of Torrington Co., covering data on high capacity ball reciprocating bearings. Outlines capacities, explains construction, illustrates designs incorporating use of the bearings. Of interest to design engineers primarily.

201—Self "Healing" Flooring . . . A bulletin issued by Continental Asbestos & Refining Corp., outlining uses of Stonoleum, a new self-bonding, self "healing" flooring that can be applied over practically all types of floors. Has applications in plants, shops, and similar applications.

202—Magnetic Reversing Starters . . . A four-page bulletin issued by General Electric Co. on its A-C magnetic reversing starters, for full-voltage starting of squirrel cage induction motors. Outlines uses, operating and construction features, lists available forms.

203—Milled Sponge Rubber Products . . . A new catalog section on its line of milled sponge rubber products, issued by B. F. Goodrich Co. Describes its sponge made from either synthetic or reclaim rubber and lists sizes, weights and other pertinent data in tables.

204—Electric Tester . . . a small folder, issued by Amerline Co., illustrating and describing the various uses of its new all-purpose electric tester in testing appliance cords, locating blown fuses, dead and live circuits, etc.

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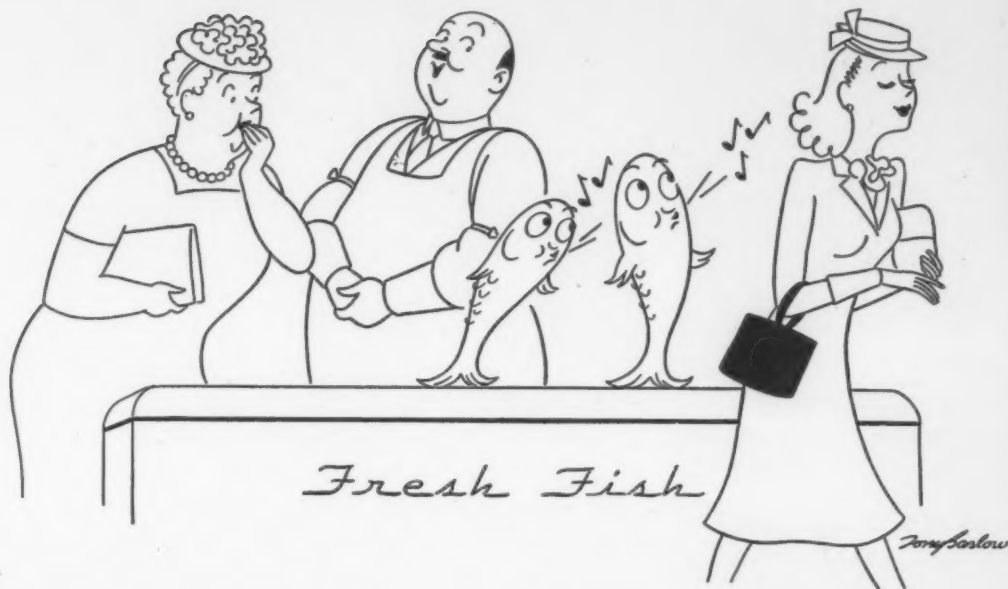
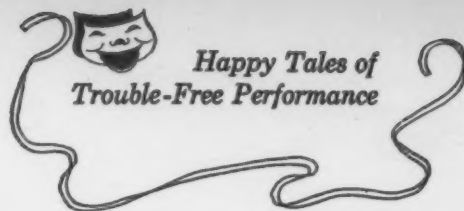
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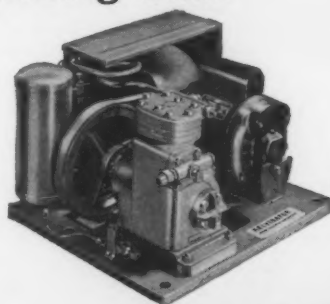


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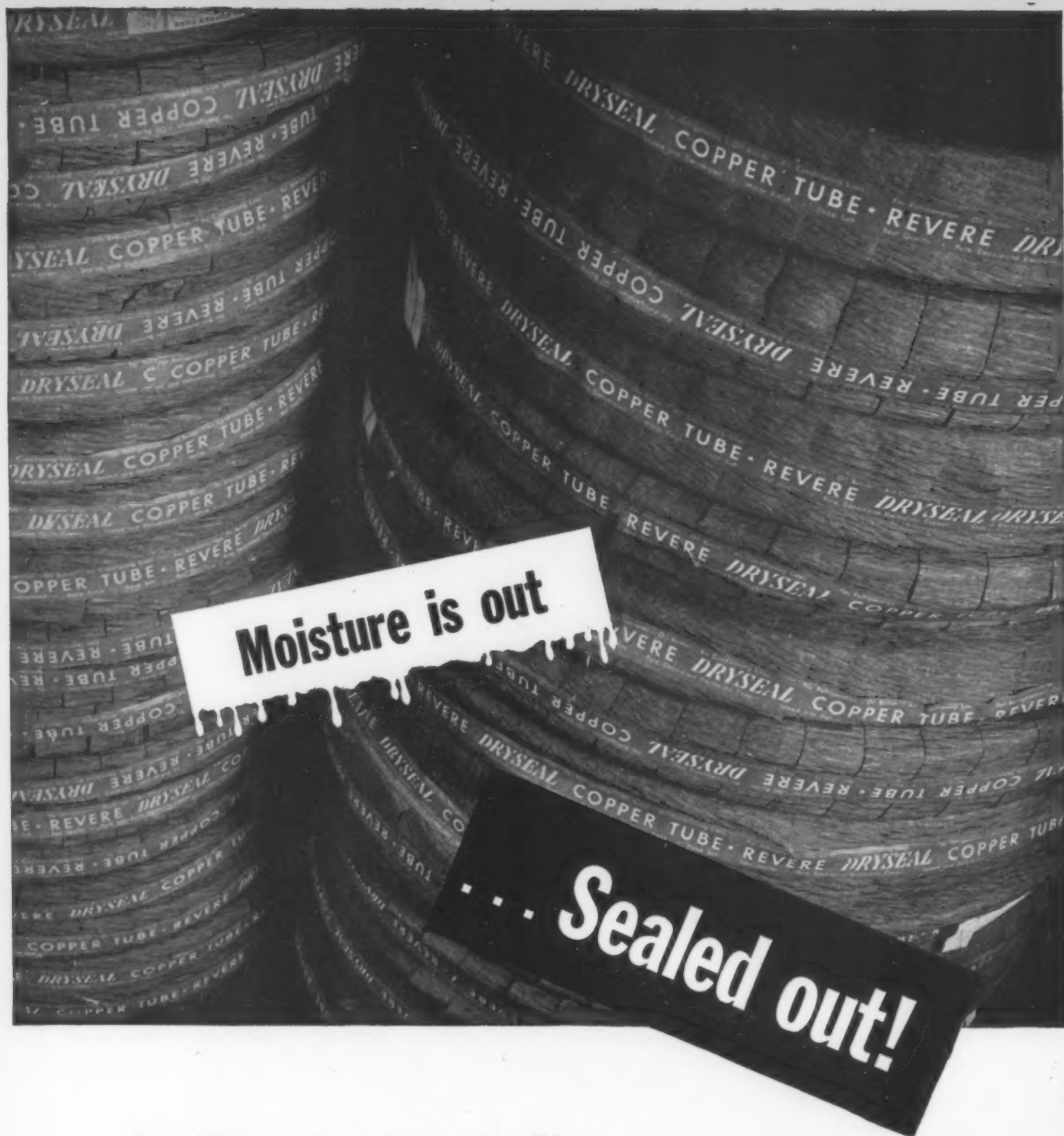


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AAVAILABLE now, Revere Dryseal Copper Tube, for refrigeration, air conditioning, heat control, bottled gas and many other uses, is sold by Revere distributors everywhere.

It comes in coils of 25, 50 and 100 feet, and each length is individually treated to remove all interior moisture, then sealed at both ends. You get it clean, bright and bone-dry, so that no moisture is present to react with any refrigerant and produce corrosive products.

This is but one of the "kid glove" treatments given Revere Dryseal Copper Tube so that it will be of utmost usefulness to you. It is made of deoxidized copper and is carefully kept free of oxides through every manufacturing step. In annealing this tube to dead softness, for example, the heating is done in a

controlled atmosphere.

It comes in sizes from $\frac{1}{8}$ " to $\frac{3}{4}$ " o. d. with .035" wall. Also available for refrigeration, air conditioning and a variety of other services is Revere Sealed End Copper Tube. Each end is plugged and taped for protection against injury and contamination. For Revere Dryseal or Sealed End Copper Tube, call your distributor. The Revere Technical Advisory Service is always available to help with your problems.

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THE REFRIGERATION INDUSTRY

WESTINGHOUSE NET INCOME DOWN

Although net sales of \$326,258,529 billed by the Westinghouse Electric Corp. for the first five months of 1945 were practically equal to the same period in 1944, the net income dropped from \$8,631,690 to \$7,689,043, a reduction of 11%.

A. W. Robertson, chairman, stated that the reduction in net income arose from lower prices on war material "following the fixed policy of the company to operate on a narrow margin in all war work although without a corresponding decrease in our manufacturing costs."

Westinghouse's backlog of unfilled orders has been cut from \$796,564,382 a year ago to \$556,818,396 at the end of May this year.

A "flying box car" featuring thermostatic temperature control for transportation of perishables has been placed into airfreighter service by American Airlines.

The new plane, converted from a standard DC-3 transport, has total cargo capacity of 7,000 pounds.

All interior walls of the air freighter are lined with fiber glass cloth, bound together with a special kind of resin. The glass cloth is tough and strong—the same material used in the flak jackets used by modern combat air fighters.

The thermostat temperature control has features unique in air transportation of vegetables, general farm produce and other perishables. Control is set for the desired temperature before the plane leaves the ground. While in flight, if the temperature goes above or below the specific degree desired, a colored light flashes in the crew's cabin. The captain can then make the required adjustment by touching an instrument beside his seat known as the "control handle."

TWO MORE STATES FORM LOCKER GROUPS

State associations of locker plant operators have recently been organized in North Carolina and Wyoming, the National Frozen Food Locker Association reports.

North Carolina officers are R. E. Nance (Lumberton), president, Dan Brady (N. C. State College) secretary-treasurer; Wyoming officers and directors include I. L. Spence (Casper) president, J. R. Black (Ranchester) vice-president, and Ben Boschetto (Rock Springs), C. N. Everling (Lingle), E. H. Melbratten (Cody) and Frank J. McCue (Cheyenne) directors.

THE PRACTICAL Refrigeration Engineering MANUAL . . . by Harold Smith

IX. Ice Cream Processing (Cont.)

PART II

AS THE product goes into the hardening room a temperature below freezing, the specific heat factor used to figure the refrigeration load is .45 and the latent heat factor is 90.0. Practically the entire specific heat load in the freezer is above freezing and carrying .80 factor load, to find the products load in the hardening room it is necessary to determine the number of gallons of cream that will be placed in the hardening room each day, times 4.9, to get the number of pounds. Again multiply the figure by 90 to get the latent heat load, add the number of pounds, and multiply by .45. Multiply the temperature reduction from about 22° to -10°, which would be a multiplier of 32.

CAN DIVIDE LOAD

Since the ice cream is frequently left in the hardening room several days, this load can be divided over this entire period; or, if faster hardening is desired, it can be figured on a 24-hour basis, whichever is preferred.

If a gravity convection cooler is used in the hardening room, either pipe coils or plate coils built in the form of shelves are usually employed. Sometimes in order to improve the efficiency of the cooler, an electric fan built for low temperature operation is placed in one corner of the hardening room to aid in the circulation of air.

In other installations developed strictly along the line of forced draft convection, a defrosting type forced air unit, using either an electric heater coil or water spray for defrosting, is employed. It is largely a matter of choice regarding the system used for cooling, and in most small instal-

lations a combination of plate coils built as shelves, and used with an electric fan, provides a very satisfactory and trouble-free installation.

REFRIGERATION ESSENTIAL

After the cream goes through the hardening room it must be kept in ice cream cabinets by the retailer, as the cream will melt if the temperature rises above 12 to 15° F. So it is clearly evident that ice cream requires low temperature refrigeration at all stages of its manufacture and handling until it is ready for actual consumption.

The three principal items of equipment in the manufacture of ice cream, therefore, are the storage cooler to hold the mix, the ice cream freezer and the hardening cooler.

In many small installations one compressor is used to operate all three of these items, particularly where brine is used in the freezer. With direct expansion in the freezer, it is usually desirable to use a separate compressor for the freezing operation, which is operated manually only while making the ice cream. Then the storage cooler and hardening cooler can be operated with one compressor or with separate compressors if so desired.

PLANT CAPACITY

The average small ice cream plant will manufacture around 200 gallons of ice cream per day and usually use one or two freezers of the 10-gallon capacity. Each of these freezers will turn out from 30 to 40 gallons of ice cream per hour, depending upon the operation layout of the product being manufactured. Where

HEAT EXCHANGERS IN LOW TEMPERATURE JOBS

In normal refrigeration practice, the size of the heat exchanger has been influenced by the particular use to which it is put. In an air conditioning system, for instance, the necessary superheat in the suction gas can be secured from the evaporator surface, because of the wide split between ambient and evaporator temperatures. In such cases the heat exchanger, if any, is very small. The exchanger also materially reduces the

tendency for flash gas to appear in the liquid line ahead of the expansion valve.

In considering low temperature installations, however, the evaporator must be used to its greatest efficiency in order to produce the required refrigerating effect with the least amount of evaporating surface at a minimum temperature split. This is because compressor capacities drop off rapidly in the low suction-pressure range for a slight reduction in suction pressure.

ordinary ice cream, such as vanilla, is being made, the production is much faster than where fruit creams are made.

Basing our operating figures on a production of 200 gallons of ice cream per day, or 40 gallons an hour, which would make the manufacturing period a five-hour operation, we submit the following example covering the load requirements:

LOAD REQUIREMENTS

We will first start with the cooler in which the mix is held until ready for freezing. If the ice cream plant capacity is 200 gallons per day and the ice cream is made on an 85% overrun, approximately 110 gallons of mix is required for one day's production. Usually the manufacturer will carry at least a two days' stock of mix, so we will assume that this cooler will have in storage 220 gallons of mix or 22 ten-gallon cans.

While these 22 cans could be crowded into a small cooler, ordinarily a cooler of $12 \times 8 \times 8$ would be recommended. This cooler would have 512 sq. ft.

To find the refrigeration load we would start with the heat leak, which would be 512 square feet multiplied by .075, which is the "K" factor for 4" sheet cork, multiplied by 40, which would be the temperature difference between the outside and inside air. We are figuring the temperature difference based on 75° outside the cooler and 35° inside the cooler. This load would be 1536 B.T.U.

The service load, based on Table D, under Chapter 2 on Service Loads, for a storage cooler under 1000 square feet, medium load, would be 512 square feet multiplied by 3.5, or 1792 B.T.U. The product load would be 220 gallons of mix multiplied by 9 pounds, the weight per gallon, or 1980 pounds.

1980 multiplied by .80 "K" factor for mix, multiplied by 10° temperature difference, reveals a total products load of 15,840 B.T.U. to be handled over a 24-hour period, or 660 B.T.U. per hour. Therefore, the products load would be 660 B.T.U.

The total of these three loads would then give you 3988 B.T.U., and putting this load on a 16-hour operation basis, would give you 5982 B.T.U. per hour.

The temperature difference on the mix is based on incoming temperature of 45° and outgoing temperature of 35°, making a 10° temperature difference. The cooler is figured on a temperature of 35° F., and if we select a condensing unit using a plus 15° refrigerant, we have 20° T. D.

If a forced-draft convection unit is used, it will be necessary to select a coil having approximately 6000 B.T.U. capacity and 20° T.D. The condensing unit operated at plus 15° refrigerant and producing 6000 B.T.U. per hour will indicate a $\frac{3}{4}$ H.P. air-cooled machine.

If the freezer would make 40 gallons of ice cream per hour it would handle 22 gallons of mix per hour, multiplied by 9 pounds, equalling 198 pounds. As the temperature of the mix in the freezer would be 38° and out of the freezer 26°, there would be a temperature drop of 12°, so we have 198 multiplied by .80 (specific heat) multiplied by 12, or 1900 B.T.U.

As about 20% of the latent heat would be removed in the freezer we would also have 198 multiplied by 18, or 3564 B.T.U., a total of 5464 B.T.U. Adding a 10% safety factor of 546 B.T.U., we would have a total freezer load per hour of 6000 B.T.U. As the mix temperature would be plus 26°, we would recommend the use of a condensing unit at -10° refrigerant which would indicate a 1 H.P. air-cooled compressor using Freon.

To operate low-temperature systems efficiently, it is desirable to have the suction gas leave the evaporator with little or no superheat. This requires the use of a heat exchanger of sufficient capacity to produce all of the required superheat in the suction gas at the point at which the thermostatic expansion valve remote bulb is located. This may be a matter of 10, 15 or 20 degrees.

Superheat Limits

It has not been found practicable to try to operate an expansion valve on lower superheats under low-temperature conditions, due to the small change in pressure of the refrigerant per degree of temperature change. This limits the power to operate the valve which is derived from the pressure difference across the power element diaphragm. If the change in these pressures is small for a given temperature change, it will require a greater temperature change to produce the required valve movement. This requires an allowance for slightly greater superheat variation as the load changes.

Second Heat Exchanger

A low-temperature system can make good use of a second heat exchanger, installed beyond the expansion valve bulb. Due to the low temperature of the superheated suction gas, the oil returning in the suction line is relatively viscous and contains an appreciable amount of liquid refrigerant, which will be released from the oil only after agitation or further heating. Any agitation at this point in the suction line of a low-temperature installation will cause a pressure drop in the suction line which will reduce the capacity of the compressor. To forestall this, the additional heat exchanger should be added between the point of remote bulb application and the compressor, to help boil the refrigerant out of the oil before oil returns to the compressor.

Heat exchangers used to evaporate the refrigerant from the oil should be chosen for size by keeping in mind the temperature of the liquid refrigerant or other heat source, the evaporating temperature, and the low heat capacity of the suction gas at these sub-zero temperatures.

AMERICA'S FIRST . . .

Continued from page 27

he moved on to that of artificially freezing water. Working night and day, giving all his time to his experiments, he finally succeeded in making a machine that fulfilled his hopes.

It froze actual ice! It was founded on the same principle that made fortunes for refrigerator manufacturers long years afterward—namely, the absorption of heat that accompanies the expansion of air. It had a compression cylinder in which air was first compressed, and then expanded in brine. A brine temperature of about 20° F. was obtained which was used for freezing water.

The machine was a proven success, but as Dr. Gorrie was low in pocket by this time, he needed money to patent it. Even though they saw ice made right under their eyes, the people of Apalachicola didn't have enough confidence to finance him, so the inventor had to go all the way to New Orleans to raise sufficient funds. There, a rich Bostonian let him have the money, and Patent No. 8080, which was granted to John

Gorrie on May 6, 1951, became the first one ever issued in the United States on mechanical refrigeration.

The rest of Dr. Gorrie's story is nothing but tragedy. He had his patent, and he wanted to build an ice-making plant on a large commercial scale. Seeking financial backing, he went to the wealthy men of one American city after another. But they all shut their eyes to an invention that would have relieved suffering and saved much loss in the hot summers. For some reason, they turned a deaf ear to all his appeals.

For John Gorrie, that was the last

straw. Disheartened and broken in spirit after so much failure, he returned to Apalachicola where, in a few years, melancholia, followed by a nervous collapse, drove him to his grave. It is only in these later years that his countrymen have given him back the renown he deserves.

CARRIER ENLARGES ATLANTA OFFICES

Carrier Corp. has recently opened a new and enlarged Atlanta branch office at 300 Ivy St. C. V. Fenn is branch manager.

Why the Trend Is Strong to CHICAGO SEALS and VALVE PLATES



CHICAGO GENERAL REPLACEMENT SEAL



ONE OF CHICAGO'S VALVE PLATES

Chicago Seals and Valve Plates make a better servicing job on all refrigerators, in less time, at less cost, at more profit . . . and more service men and more jobbers are finding out this fact every day.

CHICAGO SEAL CO.

20 North Wacker Drive, Chicago 6, Ill.

Service Engineers Should Know . . .

THE PURITY OF "VIRGINIA" SULFUR DIOXIDE IS CAREFULLY GUARDED

— the content of each cylinder—large or small—is analyzed 2 separate times.



1. CLEANLINESS TEST

A measured sample drawn from each container must be water-white in color and when boiled to dryness must leave no dirt, oil or other residue. This test detects undesirable impurities.



2. MOISTURE TEST

A sample of known weight from each cylinder is passed through P_2O_5 (a desiccant). Moisture calculated by the increased weight of the tube must not exceed 50 parts per million; low moisture prevents freeze-ups and oil-sludging.

EXTRA PRECAUTIONS

To prevent any possible contamination of "Extra Dry Esotoo" every cylinder is dry cleaned and finally rinsed with pure SO_2 before filling.

Each cylinder valve is inspected and reserviced to assure trouble-free operation—this saves time and money for the service engineer.

The name "EXTRA DRY ESOTOO" on the cylinder is your guarantee of quality. Sold by refrigeration supply jobbers everywhere.



VIRGINIA Smelting Co.

WEST NORFOLK, VA.

76 BEAVER ST., NEW YORK 5 :: 131 STATE ST., BOSTON 4
Agents for Kinetic's "Freon-12" — "Freon-22" — "Freon-11"

FRIGIDAIRE ADDS TO PLANT SPACE

E. R. Godfrey, Frigidaire general manager, has announced plans for a new addition to be made to Plant No. 4 at Moraine City, Ohio, to accommodate mass production of B-29 propellers. The proposed extension will add 220,000 sq. ft. of floor space to the present building, increasing the total area to 500,000 sq. ft.

When war production contracts are completed, the major portion of the plant will be used as warehousing space for Frigidaire products.

SODA FOUNTAIN MAKERS MAP 5-POINT PROGRAM

A five-point program to promote better manufacture, sales and maintenance of soda fountains comprises the charter of the newly organized Soda Fountain Manufacturers Association, which has its headquarters at 111 West Washington St., Chicago.

Carl J. Palmer has been appointed executive secretary of the new association. Mr. Palmer's experience in the industry includes executive positions with the Liquid Carbonic Corp. and Bastian-Blessing Co.



FLYING FLORAL ICE BOX—Gardenias have taken to the air completely refrigerated inside this Fiberglas insulated container cooled by dry ice. United Air Lines recently flew an experimental shipment of the flowers from San Francisco to Chicago. Photo shows a cargo handler inserting one of the five dry ice slabs used.

17 NEW OUTLETS NAMED BY NORGE

Appointment of 17 new Norge distributors since Pearl Harbor has been announced by M. G. O'Harra, general sales manager. They are:

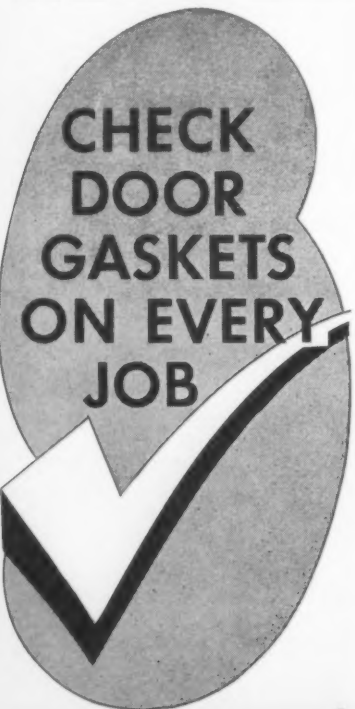
Gas Engine & Electric Co., Charleston, S. C.; Valley Appliances, Inc., Knoxville, Tenn.; Frank Lyon Co., Little Rock, Ark.; William Van Domelen Co., Menominee, Mich.; Home Furniture Co., Silver City, N. M.; Neyhart's, Inc., Williamsport, Pa.; Lincoln Sales Corp., Baltimore, Md.; Cayot & Wellman, Cheyenne, Wyo.; Appliance Distributing Co., Columbus, Ohio; Diener Appliances, Dubuque, Iowa; A. B. Gray Co., Fort Wayne, Ind.; Goyer Supply Co., Greenville, Miss.; Krich-Radisco, Inc., Newark, N. J.; Standard Equipment Co., Phoenix, Ariz.; Nevada Distributors, Inc., Reno, Nev.; John J. Moore Co., Providence, R. I.; and Mayflower Sales Co., Wichita.

IN some of our hotels, we have a considerable number of refrigerators in guest apartments. We find that the guests do not defrost the refrigerators anywhere nearly as frequently as they should.

The thought occurs to us that if manufacturers would place this message irremovably in or on each refrigerator, the users would perhaps pay more attention to this important phase of successful refrigeration. We know that defrosting is included in the literature given to the purchaser of a refrigerator, but this soon gets lost and defrosting is overlooked. For instance, if a defrosting message were baked into the enamel inside of the door the message would last as long as the refrigerator.

A. A. Headley, Roger Smith
Hotels Corps., New York City

**CHECK
DOOR
GASKETS
ON EVERY
JOB**



JARROW PRODUCTS
420 N. LA SALLE ST., CHICAGO 10, ILLINOIS

AMINCO OIL SEPARATORS



Aminco Oil Separators protect compressors by maintaining correct oil level in crankcase and by excluding oil from refrigerant stream they enable coils, condensers, valves and dehydrators to function most efficiently.

These oil separators are made for jobs from 1/2 H.P. to 120 tons and are used everywhere, ashore or afloat, where efficient refrigeration is desired.

Full descriptive bulletins on request.

AMERICAN INJECTOR CO.
1481 - 14th AVE. DETROIT 16, MICH.
Van D. Clethier, 1018 E. 16th, Los Angeles
George I. Boone, Rm. 739, 1775 Broadway, New York
W. H. Cody, Santa Fe Bldg., Dallas
Export: Borg-Warner, 310 So. Mich., Chicago

The RIGHT FLUXES for the REFRIGERATING INDUSTRY

There is absolutely no irritation to the eyes, nose or skin when using Krembs FLUXINE Fluxes. There are positively no injurious fumes. That is only one of the many advantages of Krembs FLUXINE Fluxes. They are highly concentrated . . . contain no waste material . . . just flux. That's why they do more and better brazing, soft soldering, and silver soldering.

There is a FLUXINE Flux for every metal-joining operation. For instance, our FLUXINE Flux No. 43 is ideal for low-melting-point silver solders.

There are 89 FLUXINE Fluxes . . . each for a specific job. Write us your metal-joining problems. We have 70 years of experience.

Ask your jobber about FLUXINE Fluxes. He knows they produce the best results with the greatest economy.

Write for chart which shows the FLUXINE Fluxes to use for your metal-joining problems.

KREMBS & COMPANY

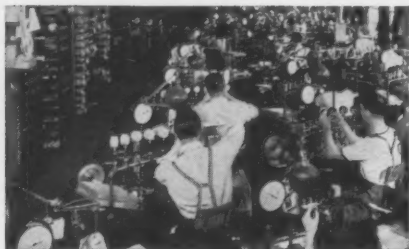
Est. 1875
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CHICAGO 10, ILL.

FLUXINE

THE REFRIGERATION INDUSTRY

She's the Clock-Watcher Type — *Intentionally!*

ONE OF THE REASONS 6 OUT OF 10 PICK U. S. GAUGES



CRUCIAL MOMENT IN A GAUGE'S LIFE

Accurate indication over the whole dial is the aim of gaugemaking. But to achieve it in modestly-priced commercial gauges requires specialized manufacture topped off by calibration with skilled hands and eyes using high speed equipment.

Gauges are adjusted and spot-tested at various points, many at a clip, on a special manifold. This is only one of numerous tests.

6 OUT OF 10 ARE U. S. CUSTOMERS

Six out of ten original equipment manufacturers using pressure and vacuum gauges specify U. S. This is no happenstance. Buyers' preference stems from U. S. *Manufacturing Control*, the watchdog of all U. S. manufacturing operations from raw material buying through calibration (the step we show you this month) to final inspection and shipment.



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CATALOG NOW

Printing of the new U. S. Gauge catalog has not quite been completed but place your reservation with us for a copy now. As soon as the presses stop we will start mailing copies to the hundreds of inquirers. This catalog has over 100 pages on gauges and gauge manufacture. Easy-finding index. Special easy-ordering guide. Request on business letterhead, please.



SPECIAL EQUIPMENT enables an experienced calibrator to spot-test and adjust hundreds of commercial gauges a day.

UNITED STATES GAUGE CO.
SELLERSVILLE, PA.

Manufacturers of Pressure, Temperature, Flow,
Electrical and Level Measuring Instruments



U. S. INSTRUMENTS Tell The Truth



ABOUT PEOPLE . . .

Continued from page 26

trict manager, brass division.

Mr. Swaton, with Kerotest for over 20 years, and Mr. Norris will maintain headquarters in the new warehouse, and the latter will coordinate all activities throughout the entire Pacific Coast area.

Van D. Clothier will continue as the southern California representative for brass valves, with headquarters at 1015 East 16th St., Los Angeles.

W. T. Farrow has been named representative of McCombs Refrigeration Supply Co., Denver, in the state of New Mexico. His headquarters will be at 1106 E. Yandell, El Paso, Tex., and he will cover the entire state for the parts jobber.



Harold R. McCombs, president of the company, reports that his organi-

zation now is in a position to serve the states of Colorado and Wyoming, New Mexico, and the western edge of Nebraska and Kansas.

Charles R. Mougey, assistant advertising manager of Airtemp division, Chrysler Corp., since 1944, has been promoted to advertising manager. Before joining Airtemp, he was 10 years with Ohio Fuel Gas Co., as advertising director.

Paul B. Zimmerman, formerly vice president of Airtemp Division of Chrysler Corp., has been elected executive vice president of Monitor Equipment Corp., and vice president of the management company, T. K. Quinn, Inc.

Before joining Airtemp, Mr. Zimmerman had been vice president in charge of sales for Norge Division, Borg-Warner Corp., and previously was general sales manager of the appliance and merchandise department of General Electric Co.

He is president of Indoor Climate Institute, and in the past has been a sponsor of such electrical industry

programs as Lighting Educational Bureau, Food Preservation Council, and Electric Refrigeration Bureau.

L. R. Burr has been named chief engineer of Kold-Hold Mfg. Co., succeeding H. W. Whitmore. Mr. Burr, who joined Kold-Hold several months ago, formerly was with the Trand Co.

F. H. Peters, formerly manager of range and water heater sales, has been appointed advertising manager of Frigidaire division, General Motors Corp. He replaces **James F. Pedder**, who is joining the Employee Cooperation Staff of General Motors in Detroit.



Mr. Peters

Mr. Peters has a background of more than 20 years' experience in advertising, merchandising, sales and sales promotion. He joined Frigidaire in 1936 as a specialist in department store merchandising, and later was

Amana HOME FREEZERS

Years of experience in building quality low-temperature refrigeration equipment are behind Amana Home Freezers. This means complete owner satisfaction.

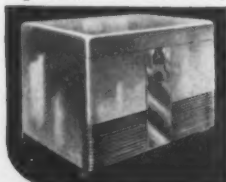
AMANA MODEL 200 . . A combination Freezer-Cooler Unit for home or commercial use. Size 8'0" long x 4'0" wide x 6'10" high. It's a large capacity sharp Freezer and Frozen Food Cabinet combined with a Walk-In Cooler. A complete private locker plant!



Write for information.

REFRIGERATION DIVISION

AMANA SOCIETY, AMANA, IOWA



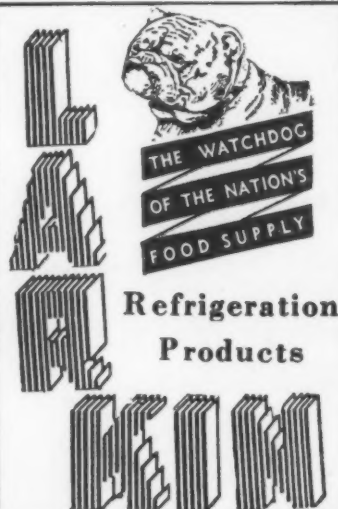
AMANA MODEL 90

A nine cu. ft. unit for larger families. Exclusive full-opening lid for easy access to all contents. Modern in every detail.



AMANA MODEL 50

A five cu. ft. model for the average home. Beautiful design . . . full opening, counter-balanced lid—all contents easily accessible.



Coils for Refrigeration
Coils for Air Conditioning
Air Conditioning Units
Hum-Temp Forced Convection Units
Polished Aluminum Disseminator
Fans
Steel Plate Coils
Evaporative Condensers
Industrial Coolers
Water Coolers

LARKIN COILS

519 Memorial Dr., S. E.
ATLANTA, GA.

THE REFRIGERATION INDUSTRY

in charge of electric range advertising and promotion and assistant sales planning manager on all appliances. Just prior to becoming manager of range and water heater sales, he had been assistant director of industrial relations for Frigidaire.

Mr. Pedder, who had been with Frigidaire since 1928 and advertising manager since early this year, will be director of employee information for the newly created Employee Cooperation Staff, directed by Frank R. Pierce, now a GM vice president.

Clarence T. Clyne has been named factory works manager of Universal Cooler Corp., replacing A. E. Knapp. Mr. Clyne formerly was with Crosley Corp., and previously had been with Bell & Howell Co., Teletype Corp., and Alemite Corp. He has a wide background of engineering, plant layout and production experience.

Mr. Knapp, who asked to be re-

lieved of his duties under doctor's orders, will remain as consultant for three months to assist in getting UCC's postwar manufacturing program under way. This will include production of a complete line of case-welded hermetically sealed refrigerating units.

John E. Haines has been named manager of the newly formed commercial controls division of Minneapolis-Honeywell Regulator Co. The new department encompasses the fol-

lowing sales divisions: air conditioning controls, Moduflow division, railway controls, apartment controls, refrigeration controls, and the aeronautical division.

Mr. Haines, who until his new appointment had been manager of the air conditioning controls division, has been with the company since 1929.

In other promotions, **H. R. Canoyer** has been named sales manager of the Central zone, with headquarters in Cleveland, and **M. S. Hamilton** sales manager of the Southeastern zone, with headquarters in Atlanta.

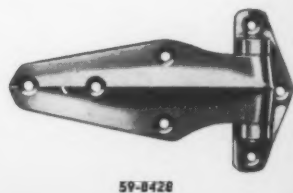
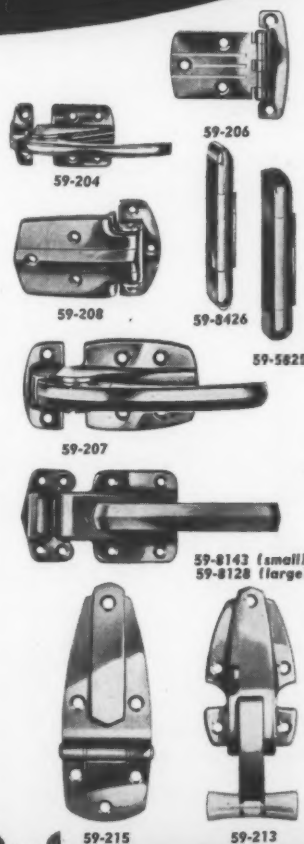


NOW AVAILABLE! REFRIGERATOR HARDWARE

complete sets in matching designs

An attractive set of stock Refrigerator Hardware is now available through your Jobber. This standard line will harmonize and be in good taste with the design of refrigerators, coolers and cabinets.

Because we are the largest manufacturer of Refrigerator Hardware in this country, we are supplying your Jobber so he can serve you without delay. Consult him for prices and other information.



TOPS! for LOW TEMPERATURE

DOLE
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COLD PLATES

Maximum Refrigeration Efficiency

for all
**REFRIGERATION
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Investigate . . . then you will specify . . . **DOLE** Vacuum Cold Plate Evaporators for maximum refrigeration efficiency.

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Manufactured by
NATIONAL LOCK COMPANY
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Be Sure with...



**REFRIGERANT
LEAK DETECTOR**

TRACE is the highly effective refrigerant leak detector with the vivid red color that quickly spots the leak in ANY refrigeration system... *new, old or reconditioned.*

TRACE is manufactured by chemists with long experience in refrigeration, who understand the special and exacting requirements that must be met by any additive to a refrigeration system. The importance of this point cannot be overemphasized.

TRADE PRICES

4 oz. bottle	\$ 1.00
(48 bottles to a case)	
1 pint bottle	\$ 3.00
(24 bottles to a case)	
1 quart container	\$ 5.00
(12 containers to a case)	
1 gallon container	\$16.00
(6 containers to a case)	
Save 10% on case lots	

*For tough-to-spot
Refrigerant Leaks*

The Fight against MOISTURE



Old man Noah was a good engineer and made his plans before the deluge came. While the rest of the world had moisture troubles for 40 days and 40 nights, the old skipper and his animal families rode out the storm in the arid ark.

Refrigeration engineers know that TZ will do the job either as a moisture preventive or cure, but the Noahs of the profession meet the problem before it arises. They inoculate new and reconditioned units with TZ.

- A TINY AMOUNT •
- A BIG JOB •
- SMALL COST •

THAWZONE

Fully Patented by U. S. Patent
The PIONEER FLUID DEHYDRANT

HIGHSIDE CHEMICALS CO.

195 VERONA AVE., NEWARK 4, N. J.

*The Moving
Dehydrant*

a duplication of orders placed with other suppliers, to be cancelled in case delivery from the other source or sources is faster. In praising Curtis for its action, Mr. Small said that if duplication of orders grows in volume, some plan for halting the practice might have to be officially applied because of its threatening to retard reconversion in some areas.

● **HOME FREEZER STANDARDS**, to prevent the sale of inefficient units to consumers by inexperienced manufacturers, are reportedly being drawn up by a committee of the Farm and Home Freezer Manufacturers Association. The committee, which will work with ASRE and American Standards Association in developing rules and procedures, comprises F. J. Bommer (Sanitary), J. K. Noel, Jr. (Victor), Henry Steinhorst (Steinhorst), and Robert H. Bishop (Midstates Engineering).

● **DISTRIBUTION THROUGH** parts jobbers is planned for a three-model line of chest-type home and farm freezers announced by Brewer-Titchner Co., Binghamton, N. Y. Three sizes would be available—12½ cu. ft., 18 cu. ft., and 23 cu. ft. Seven parts jobbers, it is reported, already have been signed up as distributors, and will wholesale the freezers to service men and dealers. Under this arrangement, jobbers would not be responsible for servicing.

● **DEEPFREEZE DIVISION** of Motor Products Corp. will depend upon independent specialty distributors for its postwar sales of home freezer cabinets, and has prac-

tically completed its U. S. distributing organization, reports F. F. Duggan, general sales manager.

Decision to distribute through independents, says Mr. Duggan, follows an extensive survey which pointed to them as best merchandisers of specialty products. Territories are determined by the independent's ability to serve the area quickly and efficiently.

Deepfreeze has named more than 40 distributors in major cities and, according to Mr. Duggan, "is fully confident that we have chosen a hard-hitting group."

● **ORGANIZATION OF** the new Refrigeration Condensing Unit Manufacturing Association (RCUMA), which comprises the product section of REMA, was completed at a recent meeting of the nine member companies.

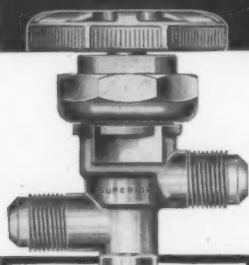
Chairman B. J. Scholl (Brunner) made the following committee appointments for the year:

Public Education: Sterling Smith (Mills); Engineering: C. E. Ploeger (Serval); chairman, S. R. Hirsch (Brunner), A. Banyai (Lehigh Foundries); Export: P. A. Karl (Brunner) chairman, H. C. Morrison (Curtis), Arthur Locke (Lynch), E. C. Pangburn (G-E); Market Study: L. R. Sears (Lynch) chairman, C. L. Olin (Serval), J. C. Miller (Lehigh Foundries).

W. Y. Rahan, of Commercial Credit Corp., expressed the belief that most war bonds would be held to maturity, and outlined a commercial selling installment plan calling for a minimum down payment of 25% and maximum terms of 18 months.

A proposal that repair parts be packaged and labeled for quick identification on jobbers' shelves was discussed, as were plans for production of "packaged" repair kits now being made by several members.

CHECK THESE FEATURES



Superior
DIAPHRAGM
PACKLESS VALVES

The only diaphragm packless valve with the internal assembly removable as one complete unit . . . a valuable feature when it comes to soldering lines to the valve connections. No need to break the diaphragm seal . . . simply remove the internal assembly as a unit . . . solder the connections . . . and replace the assembly. No fuss . . . no bother . . . no special tools . . . and above all, no damage to vital parts. What could be simpler!

But that's not the only important feature of these SUPERIOR DIAPHRAGM PACKLESS VALVES! Pressure responsive cup forms positive pressure-tight seal . . . permitting replacement of the diaphragm with full pressure in the valve . . . or even actual operation of the valve without the dia-

phragm . . . in an emergency.

Rugged, pleasing appearance—ease of operation—generous openings—extra long life—all these are standard features of the valve.

If you haven't a copy of Catalog R2, request one today.

No. 122

SUPERIOR VALVE & FITTINGS COMPANY
PITTSBURGH - 26 - PENNSYLVANIA

• OFFICES IN PRINCIPAL CITIES • STOCKS: CHICAGO (16) • LOS ANGELES (15) • JOBBERS EVERYWHERE

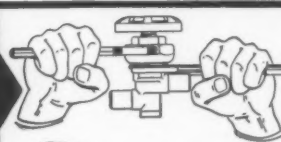


FIGURE 1—Shown wrenches properly applied to main body and auxiliary body for breaking the joint; the first step in disassembling the valve.



FIGURE 2—Observe here the entire internal assembly being removed by hand.



FIGURE 3—The entire internal assembly has been removed from the main body.



FIGURE 4—The main body, devoid of all internal parts, is now ready for cleaning and fluxing of the sweat tube connections preparatory to soldering.

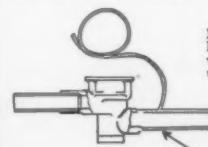
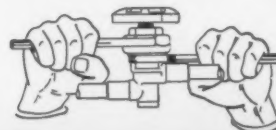
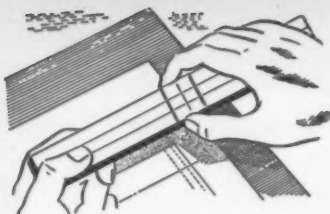


FIGURE 5—Refrigerant lines are soldered to the valve connections in the usual manner. Danger of distorting internal parts is eliminated because all these parts have been removed.

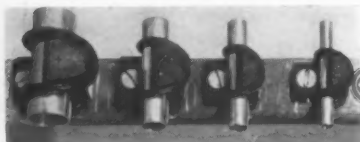




New Type Clamp

Development of a new type clamp, particularly adaptable for tube and conduit type installations of all kinds, has been announced by The Glenn L. Martin Co., Baltimore.

The clamp is shaped after an inverted lateral "s" and is fastened to the wall or frame with an ordinary screw. The tubing to be fastened is placed in the open side of the curve and the clamping ring passes around the back of the base, over the top of



the tubing and down the front where it is hooked under the curve at the front of the "s" to form a simple locking device.

The clamping ring can be made of a high grade synthetic rubber or other elastic material; the clamp proper can be moulded from a fabric base phenol fiber material or fabricated from formed sheet metal in any desired size.

Though Martin has not started production in large quantities on the clamps at the present time, this work will get under way soon either through its own facilities or those of a licensee organization.

Temperature Exchanger

Bird-White Co., Chicago has announced development of a new temperature exchanger based on the principle of heat transfer for air and gas lines and offering as a by-product, external heating applications and positive purification by centrifugal action.

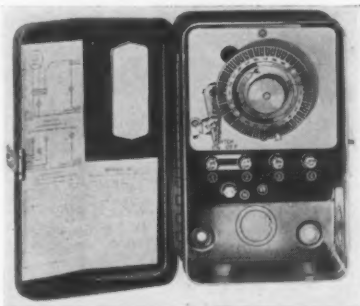
This specially designed unit, as an after-cooler, is recommended for installation at the compressor discharge point. Liberally supplied with external and internal cooling fins, the new temperature exchanger features a multiple action helicoid fighting.

Velocity of the element (air or gas) under pressure revolves the helicoid fighting at high speeds, forcing the air or gas outward against the internal cooling fins.

These internal cooling fins absorb the B.T.U.'s generated in compression, and dissipate this heat to the outside atmosphere through external cooling fins, lowering the element to room temperature in the length of the unit.

Telechron Motored Switch

Latest improvement in the Paragon 300 series time switches is the Telechron motor, an industrial type, self-starting synchronous motor which is said to add years to the life of the switch. Operating advantages claimed for this type motor include self-oiling lubrication by patented capillary oiling system, quick self-



starting at full rated load, gear reduction sealed to exclude dust and dirt and low power consumption.

The 300 series is light in weight, small and compact in design, has switch capacity of 3000 watts per pole with easily mounted accessible terminals, skip-trip feature, knock-outs on both sides, back and bottom, and two bearing plate construction. Used for a variety of time control applications these switches may now be had without a priority rating.

Resurfacer Material

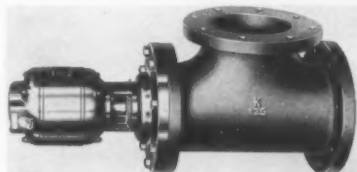
Tufcrete Co., Des Moines, Iowa, has recently issued a six-page bulletin

describing the uses of Tufcrete resurfacer, described as an asphaltic-base liquid which, added to a concrete mixture, will bond to concrete, wood or other floors. The material, it is said, will stand up under heavy traffic, requires no chipping of ruts or holes, no special tools, and can be installed by ordinary labor.

The material is said to be in wide use in industrial concerns throughout the country, where repairs of flooring must be made without undue interference with production work.

Circulating Pumps

The Ruthman Machinery Co., Cincinnati, has recently applied for patents on a new line of "Axiaflo" circulators designed for handling a very large volume of liquid at low heads with minimum power requirements.



The units are equipped with full ball-bearing, totally enclosed, dynamically balanced motors. This accurate balance is accomplished by modern dynamic process.

The sizes available are 4 inch, equipped with 1/4 H.P. motor and 6 inch with 1/2 H.P. motor. Discharge capacities are 280, 700, 950 and 1200 g.p.m. respectively. Other sizes will be added when required, including the 10 and 12 inch with capacities up to 2500 g.p.m.

Silicone Rubber Compound

Dow Corning Corp. announces the commercial availability of "Silastic," a silicone rubber, produced in various stocks for molding, extruding, coating, and laminating. Largely because of their inorganic origins, these rubbery organo-silicon oxide polymers remain elastic after heating at temperatures up to 500°F. and retain flexibility at temperatures as low as -70°F., it is claimed.

Silastic stocks are available for molding flat sheets, gaskets and other shapes. Silastic coated lead wire and other continuous extruded shapes are made from Silastic stocks designed for extruding.

Also available are stocks com-

pounded for coating glass or asbestos cloth to produce flexible, waterproof, heat stable, oil resistant gaskets, diaphragms, tape and electrical insulation which is nontracking, arc and oxidation resistant. Coatings adhere to glass, vitreous enamel, iron, steel and aluminum.

Leak Tracer Fluid

Highside Chemicals Co., Newark, has announced production of "Trace", a concentrate of intense color compounded with refrigeration-grade lubricating oil which, when added to a refrigeration system, travels with the oil and refrigerant and leaks a red stain at the point of leakage, easily identified on the exterior of the system.

The fluid can be used with any type of refrigerant, and on either old or new systems, and is said to be harmless both to the system and the user, producing no corrosion or other bad effects. Proper amount is not critical, but quantity recommended is 4 oz. for units up to 1 H.P. in capacity, and approximately 2 oz. for each additional H. P.

Frozen Food Cabinets

Weber Showcase & Fixture Co., Inc., Los Angeles, has announced frozen food cabinets of 4½ and 7 cu. ft. for postwar marketing, featuring the "Roll-A-Door" sliding door

development originally introduced by the company on its commercial ice cream and frosted food cases.

In addition to their ease of opening and closing, the sliding-door feature also permits the top of the cabinets to be used as a work-table, ready to receive packages taken from the cabinet. Also, it is claimed, loss of cold air when the cabinet is opened is less with doors of this type.

Panels of the cabinets will be of heavy-gauge steel, finished in Dulux; top of one-piece stain-finish stainless steel, with rounded edges and corners. A patented device prevents moisture from freezing along the track and impeding operation of the sliding doors.

Bushing Grinder

Of interest to refrigeration maintenance shop operators is the model LB bushing grinder manufactured by Sunnen Products Co., St. Louis, which enables jobs involving compressor rebuilding to be handled on a uniform production basis.

The bushing grinder, it is said, will grind accurately with one ten-thousandth in. with full bearing surface free from high spots or chatter marks and without bell-mouth. The machine has automatic stone feed up and tension control adjustment, and can be supplied with a variety of specialized attachments.

Proven Pittsberg Products

**SULPHUR
DIOXIDE**

**METHYL
CHLORIDE**

**METHYLENE
CHLORIDE**

Proven for
uniformity, and
low moisture
content

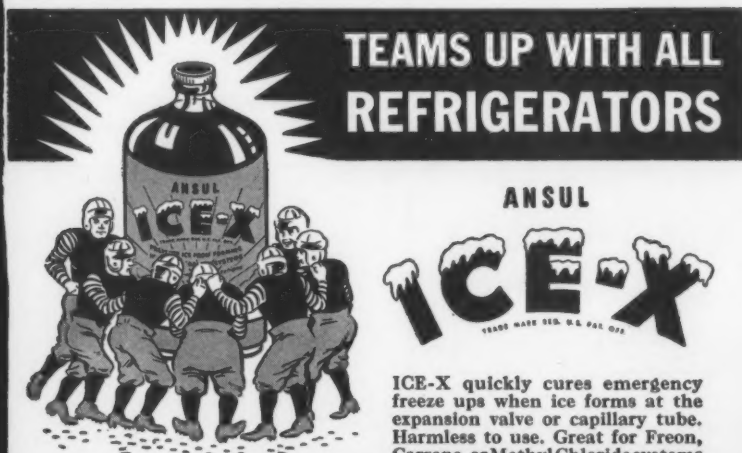
Your inquiries on other
chemicals are invited

**PITTSBERG
CHEMICAL CO.**

3100 East 26th St., Los Angeles 23, Cal.

SALES AGENTS FOR:

KINETIC CHEMICALS
FREON 11—FREON 12
FREON 22



**TEAMS UP WITH ALL
REFRIGERATORS**

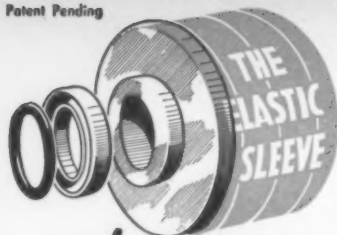
ANSUL

ICE-X

ICE-X quickly cures emergency freeze ups when ice forms at the expansion valve or capillary tube. Harmless to use. Great for Freon, Carrene, or Methyl Chloride systems... The dependable liquid anti-freeze.

ORDER FROM YOUR JOBBER OR—

EXCLUSIVE NATIONAL DISTRIBUTOR
THE HARRY ALTER CO. 1728 S. MICHIGAN AVE.
CHICAGO 16, ILLINOIS
JOBBER: WRITE FOR SPECIAL PROPOSITION!



IT'S NEW



IT'S BETTER



**Because It's
ELASTIC**

The new simplified design of THE ELASTIC SLEEVE SEAL employing the use of a new synthetic rubber-like material is pressure responsive and eliminates springs and shims. Permits simple installation—perfect operation with pitted or worn shafts, simplified replacements and assures proper lubrication.

THE ELASTIC SLEEVE SEAL has already been accepted as the "Seal of Approval" by the refrigeration industry. Write for descriptive folder.

TEMPERATURE

Control Devices

NEW HAVEN 15, CONNECTICUT

The MARKET Place

RATES: minimum, 25 words, \$2.00; each additional word, 10c. Bold type or all capitals: minimum, 25 words, \$3.00, additional words, 15c. All insertions, payable in advance.

HELP WANTED

SERVICE MANAGER with ability to organize service department and train men for organization engaged in domestic and commercial refrigeration, covering 17 Northern Ohio counties. Ample facilities to create outstanding department. State full particulars and salary requirements in first letter. Box 8453 Refrigeration Industry.

SALES ENGINEER—We need a man experienced in refrigeration work, with sales experience and a working knowledge of refrigeration parts and supplies. A definite post war future and fine advancement opportunities.

F. H. LANGSENKAMP COMPANY,
229-237 E. South Street,
Indianapolis 4, Indiana

COMMERCIAL REFRIGERATION service man. Exceptional opportunity, permanent position. Hourly rate plus commission, car allowance and profit-sharing arrangement. Must have ability and experience in servicing industrial, commercial and air conditioning equipment. We are a well-established firm located in northern Ohio. Box 8452, Refrigeration Industry.

"CLEAN-A-COIL"

**FOR
DE-SCALING
CLEANING**

**WATER COOLED
CONDENSERS,
COOLING COILS,
EVAPORATORS.**

**NOT CLASSIFIED AS
CORROSIVE LIQUID**

*Write for Descriptive Literature or Consult Your Local
Jobber*

Standard Solvent Co.

4740 WOODLAWN AVE.
CHICAGO 15

SALES ENGINEER—Leading refrigeration and air conditioning equipment jobber manufacturing own line of gravity finned coils and distributing complete line of equipment and supplies requires sales engineer for New York City area. Unusual postwar opportunities with liberal remuneration guaranteed during transitional period. Replies to be treated strictly confidential should include complete background and experience. Box 9451, The Refrigeration Industry.

REFRIGERATION service men, commercial, domestic, shop or field service. Motor repair man. \$1.50 per hr., commissions on all parts and merchandise. Full time. Excellent post war opportunities. Acme Refrigeration Engineering, 234 Seventeenth St., Merced, Calif.

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